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1. Introduction

1.1.1 This Environmental Statement forms part of an application for planning permission by Tottenham Athletic Football Club Limited on behalf of Tottenham Hotspur Football Club (collectively known as “the Club”) for the following:

"Proposed demolition and comprehensive phased redevelopment for stadium (Class D2) with hotel (Class C1), Tottenham Experience (sui generis), sports centre (Class D2); community (Class D1) and/or offices (Class B1); housing (Class C3); and health centre (Class D1) together with associated facilities including the construction of new and altered roads, footways; public and private open spaces; landscaping and related works. Details of “appearance” and “landscape” are reserved in relation to the residential buildings and associated community and/or office building. Details of “appearance” and “scale” are reserved in relation to the sports centre building. Details of “appearance” are reserved in relation to the health centre building."

1.1.2 The above development is referred to hereon after as “The Project”.

1.1.3 A site plan has been submitted with this statement (Appendix 1.1) showing the location of the Project (“the Project Site”). The Project is known as the Northumberland Development Project (NDP).

1.2 Background

1.2.1 In May 2010, the Club submitted a planning application for a new Football Stadium (designed by KSS Architects) together with associated development comprising retail, housing and a hotel (application reference HGY/2010/1000). That application was accompanied by an Environmental Statement (“the May 2010 ES”). In September 2011, the London Borough of Haringey (“the Council”) granted planning permission for the application.

1.2.2 In December 2011, the Club submitted two separate further applications for planning permission which required addendums to the May 2010 ES. The addendums dealt with Phase 1 the Northern Development (planning application reference HGY/2011/2350, and Addendum No.1) and Phase 3 the Southern Development (planning application reference HGY/2011/2351 and Addendum No. 2). Planning Permission for the revised Southern and Northern applications was granted in March 2012. The Northern Development has since been completed.

1.2.3 The revised planning permission for the Southern Development (HGY/2011/2351) was granted in outline and reserved detailed matters relating to design, scale and landscape for approval at a later stage. A reserved matters application for scale was submitted by the Club in March 2015.

1.2.4 In April 2015 the Club submitted a minor material amendment application in respect of the original 2011 planning permission under Section 73 of the Town and Country Planning Act 1990. The application sought to incorporate a new basement beneath the proposed Stadium and was approved by the Council in July 2015. Further details of these applications are set out in Chapter 3 of this Statement.
1.3 The Current Position

1.3.1 A new planning application has been submitted for the Project. Populous were instructed as architects for the Stadium, Hotel, Tottenham Experience, Extreme Sports Centre, Community Health building and public realm components of the application. Allies and Morrison being appointed to design the residential blocks within the Southern Development. DP9 were appointed to prepare the planning application, with Savills being appointed to prepare and coordinate the Scoping Report and this Environmental Statement.

1.3.2 The Plans and Drawings submitted as part of the application for approval (and those for illustrative purposes only) have been appended to this report (Appendix 1.1).

1.3.3 The specialist consultant team that were appointed to undertake the assessments for this EIA comprised the following:

- Air Quality: Air Quality Consultants
- Archaeology: L-P: Archaeology
- Cultural Heritage: Donald Insall Associates
- Ecology: CSA Environmental
- Surface Water Drainage and Flood Risk: Aecom
- Ground Conditions and Hydrogeology: Buro Happold
- Townscape and Visual Amenity: The Landscape Partnership
- Noise and Vibration: WSP and Vanguardia Consulting
- Socio-economics: Quod
- Traffic and Transport: Tim Spencer and Co
- Microclimate: BMT Fluid Mechanics Ltd
- Daylight, Sunlight and Overshadowing: GIA
- Electronic Interference: Tom Paxton

1.4 Structure of the Environmental Statement

1.4.1 The ES is set out in a structured manner to allow for easier navigation:

- Volume 1 comprises the Non-Technical Summary (NTS);
- Volume 2 (this volume) comprises the Main Report; and
- Volume 3 comprises the appendices.

1.4.2 In this volume, the ES is split into three parts:

- Chapters 1 – 5 set out the assessment requirements, the location and uses on and surrounding the Project Site, sets out alternatives that have been considered while formulating the Project, the Project description and sets out an approximate construction process.
- Chapters 6 – 18 consider the potential effects of the Project on the sensitive receptors in the surrounding area. These chapters have been structured in a uniform manner so that the assessment method and criteria, the baseline conditions, the predicted effects and proposed mitigation measures can be easily identified.
- Chapter 19 summarises the conclusions of the ES by setting out any residual significant effects that may
arise from the construction and development of the Project.

1.5  Opportunity for Public Consultation

1.5.1  Should interested parties wish to make representations on the content of this ES, or the rest of the planning application, they should be made in writing to London Borough of Haringey, Planning, Civic Centre, High Road, Wood Green, N22 8LE. Alternatively, comments can be submitted using the Council’s website:

http://www.haringey.gov.uk/index/housing_and_planning/planning-mainpage.htm

1.5.2  Hard copies of the complete ES can be purchased from Savills at a cost of £400.00. The ES may also be purchased on CD at a cost of £5.00. The NTS can be obtained free of cost. An electronic copy of the ES report will be made available on the Council’s website.
2. EIA Regulatory Framework

2.1 What Is an Environmental Impact Assessment?

Legal Background


2.1.2 The 1997 amended Directive has several purposes including, the introduction of provisions to “clarify, supplement and improve the rules on the assessment procedure” and enabling developers to obtain an opinion from the competent authority on the need for EIA. The Directive also extends the range of projects to which EIA applies and requires an outline of the main alternatives considered to the Project.

2.1.3 On the 1st of September 2008 the Town and Country Planning (Environmental Impact Assessment) (Amendment) (England) Regulations 2008 came into force to implement the requirements of the EU Directive in respect of applications for approval of reserved matters and the approval of conditions attached to planning permissions; as well as conditions attached to the grant of minerals permissions.


2.1.5 An amendment to the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 came into force on the 6th April 2015. The new Regulations are cited as the Town and Country Planning (Environmental Impact Assessment) (Amendment) Regulations 2015. The amendment concerns the thresholds at which certain types of development projects will need to be screened in order to determine whether EIA is required under the directive.

2.1.6 In addition to the EIA Regulations and Directive, there is a body of guidance that further informs the EIA process, including: DCLG (March 2014) Planning Practice Guidance EIA.

Case Law

2.1.7 The requirements of EIA have been further defined by a series of legal cases, which form an important body of guidance. Relevant cases have been considered throughout the EIA process.

2.1.8 EIA is a systematic and objective process through which the likely significant environmental effects of a project can be identified, assessed and, wherever possible, mitigated. This process and its outcomes are then reported in the ES to the local planning authority and its advisors, and the public. The NTS (Volume 1) is provided to allow a wider public understanding of the environmental effects of the Project.

2.1.9 EIA follows an iterative process that usually involves the following stages:
Screening is the first stage of the EIA process where the relevant authority (local planning authority or the Secretary of State) decide if EIA is required.

Once it has been agreed that EIA is required for the Project, scoping is undertaken to define what should be assessed. This is done in partnership between the applicant, the local planning authority and statutory consultees (including the Environment Agency, Natural England and Historic England).

With the scope of the EIA set, relevant information on the environmental baseline conditions is collected. This information is then used initially to understand the dynamics of the likely environmental effects and inform the design of the Project to avoid and/or minimise potentially significant adverse environmental effects. It is also at this stage that areas of potential environmental enhancement are identified.

Any significant adverse effects that are identified during the formal assessment stage are then reviewed against the design to consider whether alterations could be made to avoid or reduce the effect. Should the design be altered the stage is repeated.

Where significant adverse effects cannot be avoided or reduced through alterations to the design itself, mitigation measures are considered. Monitoring may also be considered to measure the actual significance of the effect during and post-construction, and allow management of mitigation where appropriate.

2.1.10 Once the EIA is completed, the ES is submitted to the local planning authority for consideration with the planning application(s).

2.2 Screening – Is an EIA Required?

2.2.1 Development that falls within Schedule 1 of the Regulations always requires EIA and is referred to as ‘Schedule 1 development’. Development listed in Schedule 2 that is located in a ‘sensitive area’ (Regulation 2(2)), or, exceeds one of the relevant criteria or thresholds given in Schedule 2 is referred to as ‘Schedule 2 development’. Not all ‘Schedule 2 development’ will require an EIA, only that development likely to have significant environmental effects due to its size, location or nature. Development that requires EIA is referred to as ‘EIA development’.

2.2.2 The Project falls within Schedule 2 section 10(b) ‘Urban Development Projects’. The site does not fall within a sensitive area for the purposes of the Regulations but does exceed the applicable threshold of 150 dwellings. The test for the need for EIA is therefore whether the Project would be likely to give rise to significant effects on the environment by virtue of its size, nature or location.

2.2.3 Given the nature and scale of the Project, the applicant has concluded that it would be prudent to undertake an EIA for the emerging proposals. Therefore a Screening Opinion has not been sought.

2.3 Scope of the EIA

2.3.1 As an ES was submitted with the original outline application, it has been considered appropriate to replicate the Scope of that ES for this application.

2.3.2 The technical scope of this EIA comprises:

- Chapter 6 - Air Quality
- Chapter 7 - Archaeology
- Chapter 8 - Cultural Heritage
2.3.3 Operational waste has been reported within a Waste Management Strategy (see Appendix 2.1). This has informed the ES with regards to waste estimations specifically in relation to the estimation of trip generation within the Transportation chapter which has subsequently informed the Noise and Air Quality assessments. Therefore, Waste has not been included as a separate chapter within the ES.

2.3.4 Waste during construction has been considered in Chapter 5 of this Statement.

2.3.5 A draft Scoping Report was submitted to the Council on 19th June 2015 which formed the basis for informal comments and discussion held with the Council in relation to the Scope of the EIA.

2.3.6 There has been extensive pre-application discussions with the local planning authority and other statutory bodies in relation to the planning application and the EIA.

2.4 Community and Statutory Involvement

Consultation Process

2.4.1 Formal pre-application discussions have been held the Council, TfL and the GLA. The pre-application consultation with these bodies has intensified in frequency to weekly meetings since May 2015.

2.4.2 Emerging scheme proposals were presented to Historic England’s London Advisory Committee (LAC) on 25th June 2015, with subsequent meetings taking place with Historic England in July.

2.4.3 Public consultation with the key stakeholders and local community was initiated in July 2015. The consultation was focused on the use of a website at www.tottenhamhotspur.com/new-scheme. The website provides updates on the scheme and an opportunity for users to provide formal feedback.

2.4.4 A newsletter was also distributed by the Club to over 20,000 local residents. Similar to the website, the newsletter contained all the key information relating to the emerging proposals for the Project.

2.4.5 A Development Management Forum was held on 15th July 2015 which members of the public were able to attend. The event, which was advertised and chaired by the Council, was attended by the Club and the Project Design Team and comprised of a presentation followed by a question and answer session.

2.4.6 Full details of the public consultation exercise are provided in the Statement of Community Involvement (SCI) which accompanies the planning application documentation.
2.5 Project Plans and Parameters

2.5.1 In order for the significant environmental effects of the Project to be identified and assessed, it is necessary to clearly identify all the components of the Project. Detailed plans have been assessed for the elements of the Project that are being applied for in Full (i.e. the Stadium, Tottenham Experience and Hotel), and fixed parameters of the Project will be assessed for the elements of the Project that are being submitted in outline (i.e. Residential, Community Health Building and Sports Centre). Further details of the Project are set out in Chapter 4 of this ES.

2.6 Impact Assessment Guidance

2.6.1 This ES will consider the potential for significant environmental impacts to affect the baseline conditions as a direct/indirect result of the Project.

2.6.2 A description of the aspects of the environment likely to be significantly affected by the Project is a requirement of the EIA Regulations. The baseline conditions are defined as the existing state of the environment and how it may develop in the future in the absence of the Project and with certain committed developments included. In order to forecast potential future effects it is necessary to make predictions. To ensure that predictions are as accurate as possible, a description of the methods used to assess the effects of the Project is also required by the EIA Regulations.

2.6.3 Unless specifically stated otherwise, the proposed assessments have been undertaken in accordance with best practice guidelines published by the relevant professional bodies. Each technical chapter in this report provides brief details of the proposed baseline and assessment methodology to be employed for that topic area. This ES provides full details of the assessment criteria and terminology used in the context of each technical discipline.

2.6.4 Where there is no topic specific guidance available, a generic framework of assessment criteria and terminology has been developed to enable the prediction of potential effects and their subsequent presentation. The development of this framework has drawn upon Savills’ experience of undertaking EIA.

2.7 Generic Assessment Framework

Receptor Sensitivity and Impact Magnitude

2.7.1 Receptors are those aspects of the environment sensitive to changes in baseline conditions. The sensitivity of a particular receptor depends upon the extent to which it is susceptible to such changes.

2.7.2 Impact magnitude is determined by predicting the scale of any potential change in the baseline conditions. Where possible, magnitude is quantified; however where this is not possible a fully defined qualitative assessment is undertaken. The assessment of magnitude is carried out taking account of any inherent design mitigation in the proposal that forms part of the Project description.
### Table 2.1: Receptor Sensitivity and Impact Magnitude

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Sensitivity to Change</th>
<th>Impact Magnitude of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>VH</td>
<td>Very High</td>
</tr>
<tr>
<td>High</td>
<td>H</td>
<td>High</td>
</tr>
<tr>
<td>Medium</td>
<td>M</td>
<td>Medium</td>
</tr>
<tr>
<td>Low</td>
<td>L</td>
<td>Low</td>
</tr>
<tr>
<td>Very Low</td>
<td>VL</td>
<td>Very Low</td>
</tr>
<tr>
<td>Negligible</td>
<td>N</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

### Effect Significance

2.7.3 As shown in Table 2.2, the effect significance is determined by combining the predicted magnitude of impact with the assigned sensitivity of the receptor. Table 2.3 sets out the broad definitions of significance. The definition of the level of significance at which a significant impact arises will be provided within the topic method section of each chapter of the ES.

### Table 2.2: Effect Significance

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Receptor Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VH</td>
</tr>
<tr>
<td>Positive</td>
<td></td>
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<td></td>
<td>VH</td>
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<td>VH</td>
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### Table 2.3: Definition of Significance

<table>
<thead>
<tr>
<th>Significance</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substantial</td>
<td>These effects represent key factors in the decision-making process. They are generally, but not exclusively associated with sites and features of national importance and resources/features which are unique and which, if lost, cannot be replaced or relocated.</td>
</tr>
<tr>
<td>Major</td>
<td>These effects are likely to be important considerations at a regional or district scale but, if adverse, are potential concerns to the Project, depending upon the relative importance attached to the issue during the decision making process.</td>
</tr>
<tr>
<td>Moderate</td>
<td>These effects, if adverse, while important at a local scale, are not likely to be key decision making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.</td>
</tr>
<tr>
<td>Minor</td>
<td>These effects may be raised as local issues but are unlikely to be of importance in the decision making process. Nevertheless, they are of relevance in the detailed design of the Project.</td>
</tr>
</tbody>
</table>
2.7.4 As required by the EIA Regulations, the likely significant effects of the EIA proposals are described as:

- Adverse or beneficial
- Direct or indirect
- Temporary or permanent
- Reversible or irreversible
- Cumulative

2.7.5 Adverse effects are undesirable and result from negative impacts. Beneficial effects are desirable and result from positive impacts.

2.7.6 Each effect will have a source originating from the Project, a pathway and a receptor. Effects which operate in this direct way are regarded as direct effects. Effects on other receptors via subsequent pathways are regarded as indirect effects.

2.8 Initial and Residual Effects

2.8.1 As stated previously, the EIA process enables the likely significant effects of a Project to be identified so that, where possible, adverse effects predicted to arise as a result of the proposal can be avoided or mitigated through the adoption of suitable measures. Additionally, enhancement measures can be incorporated to maximise the beneficial effects of the Project. The adoption of mitigation and enhancement measures results in initial and residual effects. These can be defined as:

- Initial Effects: Effects occurring as a result of the Project prior to the adoption of any additional mitigation or enhancement measures.
- Residual Effects: Effects occurring as a result of the Project taking into account the adoption of identified additional mitigation or enhancement measures.

2.8.2 Additional mitigation and enhancement is defined as a measure that is additional to the Project as initially proposed. Measures that design out significant effects that form an inherent part of the Project as proposed, known as inherent effects, are considered in the initial impact. For example many environmental constraints, such as flood risk, must be designed out of a project for it to be viable and it would be impractical to consider the Project without such measures in place.

2.9 EIA Assumptions and Limitations

2.9.1 The following key assumptions will be made in preparing the ES:

- All legislative requirements will be met. Therefore, any standard guidance which is provided to ensure minimum legal compliance is not considered to constitute mitigation in the EIA and will not be taken into account.
- The assessment of effects prior to the adoption of mitigation measures will assume that the Project will be constructed in accordance with industry standard techniques. Such techniques will therefore not be
considered as mitigation.

- Where further assumptions have been made for individual topic assessments these will be identified within the relevant topic chapters.
- Any limitations or uncertainties associated with impact prediction or the sensitivity of receptors due to the absence of data or other factors will give rise to uncertainty in the assessment. Any such limitations will be referred to in the relevant technical chapters of the ES.
3. Project Site and Setting

3.1 Project Site Location

3.1.1 The Project Site occupies an area of 8.97 hectares, and is bound by Lilywhite House (comprising the Sainsbury’s foodstore fronting Northumberland Avenue; the Tottenham University College; and Tottenham Hotspur Football Club’s administrative offices) to the north, High Road to the west (A1010), Worcester Avenue to the east, and Park Lane to the south. The site is focussed on the current Tottenham Hotspur Football stadium, which is located at Bill Nicholson Way, 748 High Road, London N17 0AP.

3.2 Project Site Boundary

3.2.1 The southern site boundary runs east to west along the southern pavement of Park Lane, from Park Lane’s junction with Vicarage Road to Park Lane’s junction with the High Road, at which point it turns south along following the building line of the 732 High Road until the public conveniences that line the east side of High Road.

3.2.2 The western site boundary is formed by the western side of High Road from the point at which the boundary crosses the High Road to the south and extends north until White Hart Lane. The boundary then crosses High Road and continues up the eastern pavement of High Road to the junction of High Road and Northumberland Avenue.

3.2.3 The northern boundary is largely formed by the boundary with Lilywhite House, which runs east to west from Worcester Avenue to the edge of the Sainsbury’s service car park to the rear of No. 792 High Road (Dial House). The site boundary then extends northwards up to Northumberland Avenue meeting the western boundary. The boundary includes the properties at 796 - 814 High Road. The site boundary in this location excludes Nos 792-794 High Road.

3.2.4 The eastern boundary runs along the eastern pavement of Worcester Avenue from Park Lane in the south to Northumberland Avenue in the north. The site boundary extends across the road to the pavement on the western side of the road but does not include the properties at Nos. 01-41 that flank Worcester Avenue to the west, and Nos. 02-32 that flank Worcester Avenue to the east.

3.3 Existing Buildings onsite

3.3.1 The majority of the site is currently occupied by the existing Stadium, which is located to the south east of the site, bound by Worcester Avenue to the east and Park Lane to the South. The current Stadium has a spectator capacity of 36,237. Its four stands have been built at different times with the current East and West stands redeveloped in the 1980s and the North and South stands redeveloped in the early 1990s. The Stadium comprises a variety of different architectural treatments and the result is a building that is does not make a positive contribution to setting of nearby Listed Buildings of the High Road Conservation Area. The current stadium is generally between 22-24m high, which is broadly equivalent to 7-8 residential storeys.

3.3.2 To the west of the Stadium, fronting on to High Road, are a series of buildings including:
The Club’s merchandise store “Spurs Shop”, located immediately west of the stadium on the junction of High Road and Park Lane. It is a single storey white rendered building and its existence is subject to a temporary planning permission. This building is identified as a detractor in the Conservation Area Appraisal.

No.744 High Road named “Warmington House”. This is a grade II listed three storey building, three bays wide built in circa. 1828. The building, now vacant and boarded up, is built from period materials of brick and stucco, and was last used as the Tottenham Hotspurs Supporters Club offices. The building is set back from the High Road and has a two storey extension to the south and a further two storey extension to the west.

No.746 High Road named the “Dispensary”. This is a locally listed building built in circa. 1910, it is three storeys high, and taller than Warmington House, and three bays wide. It is built from stone and red brick and is now vacant and boarded up.

No.748 High Road named the “Red House Coffee Palace”. This is a locally listed building is three storeys high with two pitched roofs. It is situated on the southern corner plot at the junction of High Road and Bill Nicholson Way. It is accessed from Bill Nicholson Way.

No.750 High Road named “Valentino’s”. This is a locally listed building, and a former public house was built in circa. 1890/early C20. The building occupies the northern corner plot of High Road and Bill Nicholson Way. It is three storeys high and currently vacant.

3.3.3 To the north of the Stadium and Valentino’s up to Lilywhite House and Dial House, the site is hoarded along the High Road and Worcester Avenue. The land within this hoarding includes the Archway Metals buildings with the rest of this part of the site currently subject to site clearance and preparatory ground works associated with the previous planning permission for the development of a new stadium (ref: HGY/2010/1000).

3.3.4 The northern part of the site, known as the “Northern Terrace” includes the following buildings:

- Nos. 794, 796, 798 – 802. These buildings are a continuous terrace of three storey high mid C18 period properties. The houses are of irregular size; Nos. 794 and 796 are of five bays, the others narrower. Nos. 798-802 continue the mid C18 terrace. The narrow gap that once existed between Nos. 798 and 802 has been built over at 1st and 2nd floor levels in modern times in a reasonably sympathetic style. The properties are built within plots and set back from the High Road, with each having a front forecourt and boundary treatment. They are all statutorily grade II listed apart from 796 High Road, named “Percy House” which along with its forecourt, walls and railings, is Grade II*. Percy House has recently been the subject of an approved application by the Tottenham Hotspur Foundation (a charity founded and associated with Tottenham Hotspur Football Club) that will refurbish and bring the building back into use as a community facility.

- Nos. 804/806. These properties are contained within a further three storey terrace block. They are not statutorily or locally listed and are not identified as positive contributors to the Conservation Area.

- Nos. 808/810. They are grade II* listed buildings and together are a pair of early red brick C18 symmetrical properties of 3 storeys plus attic. They sit back from High Road and have front forecourts and boundary treatments. No. 810 benefitted from investment from Historic England (previously English Heritage) to restore it.

- No. 814. This property is located on the southern corner plot at the junction of the High Road and Northumberland Park in a single mid C19 two storey building, with its principal elevation fronting onto
Northumberland Park. The building is locally listed.

3.3.5 Dial House, located at No. 790 High Road and the adjacent property at No. 792 High Road do not form part of the application site.

3.4 The Surrounding Area

3.4.1 The Project Site is located in Northumberland Park Ward. The administrative boundary with the London Borough of Enfield lies approximately 500m north of the site with Angel Edmonton and the A406 North Circular Road approximately 650m beyond. The Lee Valley and the London Borough of Waltham Forest lie approximately 1.5km to the east of the Project Site. The designated town centre of Bruce Grove lies approximately 700m to the south of the Project Site with the town centre of Seven Sisters a further 800m south of Bruce Grove. The Metropolitan Centre of Wood Green lies approximately 3km west of the Project Site with Alexandra Palace a further 1.5km beyond.

3.4.2 The stretch of the High Road immediately to the west of the Project Site that runs north from Bruce Grove to the Stadium accommodates various town centre uses such as Council Offices, Tottenham Sports Centre and a Public Library. This is supported by a range of retail uses.

3.4.3 Immediately to the east of Worcester Avenue is Northumberland Park Community Secondary School and Saint Paul’s and All Hallows Church of England Infant and Junior Schools. Immediately to the west of High Road lies St Francis de Sales Roman Catholic infant and junior school and further west is the Lancastrian Primary School.

3.4.4 The closest public park is Bruce Castle Park approximately 300m south west of the site.

3.5 Project Site Accessibility

3.5.1 All of the streets surrounding the Project Site are accessible to pedestrians and have footpaths on both sides with a number of crossing facilities. On the High Road the pedestrian crossing facilities are focused at the junctions with Northumberland Park, White Hart Lane and Park Lane with additional facilities along the street. There are also a number of facilities situated on Northumberland Park and Park Lane further from the site. The Public Transport Accessibility Level (PTAL) for the site, which is a theoretical measure of the accessibility within London, ranges from 3 (moderate accessibility) to 5 (good accessibility).

3.5.2 There are several railway stations within easy access to the Project Site, these are:

- White Hart Lane- 6 min walk from the site;
- Northumberland Park- 600m to the east;
- Bruce Grove- 1.1km to the south;
- Tottenham Hale- 2.2km to the south; and
- Seven Sisters- 2.3km to the south.

3.5.3 On match days White Hart Lane is the most used railway station although Northumberland Park is also well used. The rail operator for the area (National Express East Anglia) also runs extra services on match days to cater for this demand.
3.5.4 The use of the London Underground rail network varies greatly between non-match days and match days. Seven Sisters and Tottenham Hale are the closest underground stations and are both on the Victoria Line. Of these two Seven Sisters is the most used station despite being further from the site. This is due to it providing access to a greater number of other lines and rail networks.

3.5.5 The Project Site is well served by bus routes from a wide range of neighbouring areas. Most routes can be accessed from bus stops on the High Road although a few can also be accessed from Northumberland Park to the North, Lansdowne Road to the south and Shelbourne Road to the east. Most of the bus routes connect the site with Seven Sisters rail and Underground station and central London.

3.6 Site History

3.6.1 The Tithe map of 1844 shows the Project Site to comprise a number of fields with several houses, cottages and tenements. For a period prior to the 1900s much of the Project Site was formed by the properties (and their gardens to the rear) that front on to the High Road. Maps dating from 1867, 1876 and 1896 indicate that much of the area to the rear of these properties was used as orchard. The Middlesex map from 1896 identifies Tottenham Nursery on the southern part of the Project Site.

3.6.2 By the early 1900s the a pair of semi-detached villas on the High Road south of Fletcher House had been demolished to form Paxton Road, while four terraced houses had been constructed to form the eastern end of Paxton Road. However, the High Road frontage north of Paxton Road onto the High Road retained some of its 18th Century features late into the 19th Century. The Grade II Listed Fletcher House is situated adjacent to Paxton Road facing the High Road. This early 19th Century house was owned by Joseph Fletcher and occupied as early as 1844.

3.6.3 The 1913 and 1920 edition maps show that the nursery had been replaced by the football ground located towards the southern end of the site to the rear of buildings fronting onto the High Road. Its northern and southern boundaries formed by Paxton Road and Park Lane. At this time a west stand is shown with the other three sides shown as inclined ground. The northern part of the site is shown as having undergone less change during this period from 1896 to 1920.

3.6.4 By 1935 stands are shown on all four sides of the Stadium. A public house and engineering works along with other properties are shown fronting on to the High Road adjacent to the Stadium and these uses remained in place on the 1958 map. To the north a series of three terraced blocks of residential dwellings were present on the Project Site facing directly onto Paxton Road (22 dwellings), or immediately behind these (four dwellings). To the north of these is shown a brewery and allotment gardens. These again remain in place on the 1958 map. Further north on the Project Site to Northumberland Park is an area of predominantly industrial and engineering buildings with residential and commercial property fronting on to the High Road.

3.6.5 The area of Tottenham has a history of industry, particularly light industry and engineering. Wingate Trading Estate, to the north of Paxton Road, is an existing brownfield site and has been operating as an industrial site for at least 73 years. By 1959 some 40 firms occupied the site.

3.6.6 By 2001, the southern part of the Project Site comprised the current Stadium and associated buildings along with a number of buildings fronting on to the High Road. To the north of Paxton Road were a series
of terraced dwellings, a church hall, works, Council offices, funeral directors and a petrol filling station among other uses. To the north of this is the Wingate Trading Estate.

3.6.7 In front of the existing football Stadium, there are two Grade II listed buildings. Further along the High Road are eleven buildings, four which are Grade II* and seven which are Grade II. A forecourt and railings have also been listed as Grade II*. Two of these buildings are listed on English Heritage’s Buildings at Risk Register. Part of the site is located within a Conversation Area that includes the High Road frontage.

3.7 Topography and Geology

3.7.1 The site and the immediate environs are located on level ground around the 12m contour above ordnance datum (AOD). To the east the land slopes gently to the River Lea, the most influential natural feature of the area and the largest tributary of the lower Thames Valley.

3.7.2 The site is underlain by brick earth and floodplain gravel over London Clay in turn over the Lambeth Group and over Cretaceous Upper Chalk at depth. These gravel deposits vary in thickness and in some places are up to 5.7m in depth. It is not known how deep the deposits are within the immediate area of the site.

3.8 Land Use Designations

The Development Plan


3.8.2 In addition to the Development Plan, in assessing the Project, regard has been had by Savills and the Club’s consultants to national planning policy and guidance as set out in the National Planning Policy Framework (NPPF) and National Planning Policy Guidance (NPPG). Regional supplementary documents and guidance as adopted by the Mayor of London and local supplementary guidance as adopted by LBH.

3.8.3 A overview of the current policy position for the site is set out in Appendix 3.1 of this ES.

Ecological Designations

3.8.4 The site is located within 2km of Walthamstow Reservoirs Site of Special Scientific Interest (SSSI), designated due to its importance for wildfowl and wetland birds. The SSSI is a component of a Special Protection Area (SPA) and Ramsar site because it supports internationally important overwintering populations of three bird species. These designations afford the site protection under both European and international law.

3.8.5 Furthermore, London Wildlife Trust’s website WildWeb has listed two non-statutory Sites of Importance for Nature Conservation (SINC) located within proximity to the Project Site. These are: Tottenham Hale and Northumberland Park Railsides; and, Tottenham Cemetery, All Hallows Churchyard and Bruce Castle Park; both of which are of Borough Grade 2 Importance.
Water Resources

3.8.6 According to the Environment Agency, most of the site lies within an Outer Groundwater Protection Zone. The vast majority of the site is in Flood Zone 1 with small areas along the western boundary in Flood Zone 2.

3.8.7 The site area located within Flood Zone 1 comprises land assessed as having less than 1 in 1000 annual probability of river or sea flooding in any year. However, immediately to the west of Tottenham High Road is the culverted Moselle Brook, which is assessed as being in Flood Zone 2, i.e. having between a 1 in 100 and 1 in 1000 annual probability of river flooding (the light blue on Figure 3.3). The Brook flows eastwards from Tottenham Cemetery through a series of culverts before ultimately flowing into the River Lea to the east of the Project Site.

3.9 The Baseline

3.9.1 The assessment has been based on the comparison of qualitative and where possible quantitative predicted impacts compared with existing baseline environmental conditions. Any significant changes expected in future baselines due to environmental trends will also be described qualitatively, or in certain cases calculated as quantitative future baseline to allow meaningful future year assessment. These future year baselines can take account of cumulative developments not yet built although in the planning system. These approaches are explained in further detail in the relevant chapters concerned.

3.9.2 The consented planning baseline of the site is that which has been granted planning consent. A number of planning consents have been granted on this site as set out below.

<table>
<thead>
<tr>
<th>Application Number</th>
<th>Description of Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGY/2010/1000</td>
<td>The original “NDP planning permission” which secured part full and part outline planning permission for the redevelopment of the NDP site for a new football stadium and associated non-football development to the north and south of the new stadium site. This permission was granted on 20th September 2011.</td>
</tr>
<tr>
<td>HGY/2011/2350</td>
<td>The “Northern Development permission” which secured a new full planning permission for the northern element of the NDP site, comprising foodstore, education, stadium-related and showroom/brand centre uses. This permission was granted on 29th March 2012.</td>
</tr>
<tr>
<td>HGY/2011/2351</td>
<td>The “Southern Development permission”, referenced HGY/2011/3251, which secured a new outline planning permission for the southern part of the NDP site for residential, college, health club and centre and office uses. This permission was granted on 29th March 2012.</td>
</tr>
<tr>
<td>HGY/2015/0964</td>
<td>The “Stadium Basement permission” which secured a minor material amendment to the “NDP Planning Permission” for a new basement level beneath the approved stadium, to accommodate changes to the proposed basement and ground floor layouts, and the removal of certain conditions. This permission was granted on the 08th July 2015.</td>
</tr>
</tbody>
</table>

3.9.3 A summary of the planning applications listed above can be found in the Planning Statement which
accompanies the planning application documentation.

The Consented Position

3.9.4 The current planning permissions are considered as being contextually relevant to the assessment of the revised proposals for the Project. In particular planning permission (which remains capable of being built out) has been granted for:

- A Stadium with a 56,250 capacity with a typical season of 26 matches, plus an additional 4 non-football events per year at near capacity attendance of around 56,000 people;
- A total of 319 car parking spaces (18% wheelchair accessible) associated with the Stadium;
- Up to 285 residential units within 4 blocks (36 storeys);
- Up to 15,000 sqm of floorspace for health centre and/or health club and/or college uses;
- Circa. 4,800 sqm of Stadium back of house / storage areas and 1,500 sqm of VIP lobby / reception areas associated with the car parking;
- Podium up to 25.500m above AOD (minimum of 0m above AOD);
- Residential blocks 1 and 4 at a maximum height of 47.89m above AOD (minimum of 23.28m above AOD); and
- Residential blocks 2 and 3 at a maximum height of 57.49m above AOD (minimum of 23.28m above AOD).

Future Baseline & Assessment Scenarios

3.9.5 The ES is required to assess potential impacts on the existing baseline environment. It is also a requirement in the Regulations to assess the future baseline conditions. The baseline conditions are defined as the existing state of the environment (Section 3.9). Future baseline conditions are how it may develop in the future with the Project and with certain committed developments.

3.9.6 Future baseline conditions have been considered by identifying the developments (and other land use/environmental changes) that are likely to happen over the same time period as the Project. This approach to defining the future baseline conditions has been used to address the requirements under Schedule 4, Regulation 2 (1) in the Town and Country Planning (EIA) Regulations (As Amended) (2015) to consider cumulative effects.

Cumulative Assessment

3.9.7 Schedule 4 of the EIA Regulations requires that the cumulative effects of the Project should be included within the ES.

3.9.8 The EIA Regulations does not set out a methodology for cumulative impact assessment. However, in many cases the broad methods employed for Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) can be used. The European Commission has also produced a ‘Study on the Assessment of Indirect and Cumulative Impacts as well as Impact Iterations’ (May 1999). These methodologies are generally qualitative since many of the interactions are too complex to robustly model quantitatively.

3.9.9 European guidance on cumulative impacts (Document EC DH XI) “Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions” (May 1999) defines cumulative impacts
as “impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project”.

3.9.10 The guidance goes on to state that:

“Activities in the past, present and future can all have a bearing on the project being assessment and will influence the time frame set for the EIA. Setting time frame “boundaries” will allow for the inclusion of past and future developments which could lead to indirect or cumulative impacts or impact interactions……

In practical terms the extent of the assessment in terms of how far into the past and into the future will be dependent upon the availability and quality of information. Past activities can often be identified from historical maps, present activities from current maps and future development activities from development plans…..

In setting the future time boundary it is suggested that in general beyond 5 years there is too much uncertainty associated with most development proposals…..

……it is only reasonably to consider current events and those that will take place in the foreseeable future. Furthermore, the assessment can only be based on the date that is readily available. There needs to be a cut off point at which it can be said that the impacts cannot be reasonably attributed to the project.”

3.9.11 The cumulative impact assessment will be considered in the following categories:

- Combined Effects of Individual Impacts - (arising from the project on a potential receptor. For example noise and dust on a single receptor.); and

- Combined Effects with Other Developments.

*Combined Effects of Individual Impacts*

3.9.12 Combined effects on individual receptors have been assessed and are set out within Chapter 19, Table 19.2. The residual impacts that have been identified by each discipline have been analysed to identify receptors that may be impacted by combined effects from, for example, Air Quality and Noise.

3.9.13 Where a single receptor has been identified as being impacted by combined effects, this exercise has assessed the potential residual impacts on single receptor.

*Combined Effects with Other Development*

3.9.14 In respect of potential cumulative effects with other developments the Planning Practice Guidance (Paragraph 24) states the following:

“Each application (or request for a screening opinion) should be considered on its own merits. There are occasions where other existing or approved development may be relevant in determining whether significant effects are likely as a consequence of a proposed development. The local planning authorities
should always have regard to the possible cumulative effects arising from any existing or approved
development. There could also be circumstances where two or more applications for development should
be considered together. For example, where the applications in question are not directly in competition
with one another, so that both or all of them might be approved, and where the overall combined
environmental impact of the proposals might be greater or have different effects than the sum of their
separate parts.”

3.9.15 Therefore it is considered that that a robust cumulative assessment will account for any existing or
approved developments (i.e. anything with planning permission) and any application which could give rise
to cumulative impacts.

3.9.16 The scope of committed developments to be assessed within the cumulative assessment will be based
on a criteria set out in each technical topic, if relevant.

3.9.17 On the 16 June 2015, the Council provided a list of major applications (10+ units / 1000+sqm floorspace)
in the N17 postcode (Tottenham, South Tottenham and Haringey) that had been approved in the last 5
years or pending. The list covered all applications within a 1 mile radius of the Project Site. In addition to
this, details of 3 significant major applications were included that were outside of the N17 postcode. This
information was subsequently compiled into a schedule and mapped out which has been included within
Appendix 3.2.

3.9.18 The schedule and map were issued to the technical consultant team for their consideration to scope in or
out the committed developments that would be included within their assessment. This is based on their
standard practices and using their professional judgement. Some of the developments identified had
already been captured within the 2015 traffic survey, and therefore it is considered unnecessary to
assess them further within the cumulative impact assessment.

3.9.19 A summary of Appendix 3.2 is set out in Table 3.1 below:
### Table 3.1: Summary of Cumulative Developments

<table>
<thead>
<tr>
<th>Reference Number</th>
<th>Project Description</th>
<th>Topics that have included the developments within their assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGY/2008/2220</td>
<td>Demolition of existing buildings and erection of 4 storey building comprising 366 sqm of retail floorspace plus Kingdom Hall with 34 flats, plus 17 car spaces and 44 cycle spaces.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2009/1122</td>
<td>Demolition of existing building behind retained facade and erection of a four storey building, retail / commercial unit; a three storey building; 4 two storey houses.</td>
<td>Cultural Heritage</td>
</tr>
<tr>
<td>HGY/2009/1532</td>
<td>Retention of the existing structural frame comprising Scotland Green House, rebuilding of the front and rear elevations, adding a fourth storey to the existing building and erection of a new four storey building to the front of the site to provide 42 residential units and one commercial unit.</td>
<td>Cultural Heritage and Townscape and Visual</td>
</tr>
<tr>
<td>HGY/2009/2123</td>
<td>Demolition of Broadwater Farm Primary School and William C Harvey Special School, and redevelopment of the site to provide a purpose-built two storey inclusive learning centre (520 places, primary age).</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2009/2140</td>
<td>Demolition of existing buildings (500 White Hart Lane and Hubert House) and erection of new steel cladded light industrial unit.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2010/0201</td>
<td>Demolition of existing buildings and erection of 3 storey buildings to provide 175 sqm of retail floorspace and 39 residential units.</td>
<td>Cultural Heritage and Townscape and Visual</td>
</tr>
<tr>
<td>HGY/2010/1000</td>
<td>Demolition and comprehensive redevelopment of a stadium, with use, hotel, retail, museum, offices and housing.</td>
<td>Cultural Heritage and Townscape and Visual</td>
</tr>
<tr>
<td>HGY/2010/1897</td>
<td>Demolition of all structures for the development of up to 1210 residential units, student accommodation, office, hotel, retail, a health centre, a health club, creche, and a primary school. Building blocks ranging in height from 1 to 18 storeys.</td>
<td>Townscape and Visual</td>
</tr>
<tr>
<td>HGY/2010/1427</td>
<td>Erection of two 10-storey blocks to provide 140 flats.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2010/1897</td>
<td>Erection of a part 7, part 10 and part 12 storey building to comprise student accommodation (524 bed spaces).</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2010/1897</td>
<td>Approval of reserved matters for 194 residential units,1600 sqm of retail floorspace.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2011/0814</td>
<td>Development comprising of construction of three industrial buildings accommodating a total of 13,251 sqm (142,629 sqft) of gross employment floorspace.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2011/2302</td>
<td>Redevelopment of site comprising of single storey food store with 88 vehicle parking spaces.</td>
<td>Cultural Heritage</td>
</tr>
<tr>
<td>HGY/2012/0427</td>
<td>Erection of 4 storey building (plus basement) to provide A1 retail use at ground and basement levels and 26 residential units.</td>
<td>Cultural Heritage and Townscape and Visual</td>
</tr>
<tr>
<td>HGY/2012/0563</td>
<td>Conversion of Grade II listed building to provide 9 residential units and erection of a new building to the rear to accommodate 4 self contained flats.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2012/2128</td>
<td>Comprehensive redevelopment of the Brook House, including the erection of a 22 storey building providing 100 residential units and 190 sqm of commercial floorspace, two buildings of 6 and 9 storeys respectively providing 101 residential units and a part 2/part 5 storey building comprising a 2,388 sqm 2 form entry primary school and 21 residential units.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2013/0155</td>
<td>Partial demolition of existing buildings, retaining existing historical facade, construction of student accommodation over 3 and 4 floors to provide 64 student rooms and amenities areas.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
</tbody>
</table>

Tottenham Athletic Football Club Limited

September 2015

3.10
<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
<th>Cumulative Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGY/2013/0745</td>
<td>Erection of 4 storey building comprising 3 commercial units and 16 residential units.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2013/1792</td>
<td>Demolition of Unit 11, Mowlem Trading Estate, resurfacing of trading estate service road, relocation of electricity substation and redevelopment of land fronting Watermead way.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2013/2485</td>
<td>Redevelopment of the site to provide a new four storey building housing 50 extra care residential units (Use Class C3).</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2013/2610</td>
<td>Works to extend the operational railway station at Tottenham Hale.</td>
<td>No Potential Cumulative Impact Identified</td>
</tr>
<tr>
<td>HGY/2014/0498</td>
<td>A 96 bed hotel (Class C1) including a 146sqm restaurant/bar, 3 disabled car parking spaces and 6 dedicated cycle spaces.</td>
<td>Air Quality, Noise and Transport</td>
</tr>
<tr>
<td>HGY/2014/1041</td>
<td>Demolition of side and rear extensions. Conversion of part ground, first and second floors into four flats.</td>
<td>Air Quality, Noise and Transport</td>
</tr>
<tr>
<td>HGY/2014/1080</td>
<td>Redevelopment of the site to provide a new four storey building housing 52 extra care residential units (Use Class C3).</td>
<td>Air Quality, Noise and Transport</td>
</tr>
</tbody>
</table>

3.9.20 With regards to the cumulative assessment of multiple development, it is difficult to determine the exact level of significance that can be attributed to multiple development, particularly where those developments have not been subject to an EIA. As such, in the absence of EIA for multiple developments, assessments have to be conducted based on professional judgement.

High Road West

3.9.21 The Council and the Greater London Authority (“GLA”) are working on a 20-year regeneration programme for Tottenham, which is focussed on delivering in excess of 10,000 new homes in the wider area. The plan includes the regeneration and redevelopment of the large housing estate known as High Road West. Whilst High Road West is not defined as cumulative development as set out above, in pre-applications with the Council they expressed a strong desire for High Road West to be considered within the ES with regards to the potential for Transport and Air Quality impacts.

3.9.22 The overall High Road West site allocation has been masterplanned for comprehensive redevelopment creating a mixed use neighbourhood including a new public realm linking White Hart Lane Station and the redeveloped football stadium as well as an expanded local shopping centre for the High Road.

3.9.23 The site requirements as set out within the Council’s and GLA’s regeneration plan states that there will be:

- A minimum of 1,400 new home with a mix of tenure, type and unit size;
- Creation of a new connection between White Hart Land Station, the High Road and redeveloped football stadium;
- An increase in the quality and quantity of community facilities;
- Sympathetic development to heritage assets which should seek to enhance the overall viability and attractiveness of future investment for heritage buildings in the area;
- New transport improvements delivered including new entrance to White Hart Lane Station

3.9.24 The Council has prepared a masterplan for the area which was consulted on and later adopted on 16 December 2014. This masterplan sets out that the development will deliver approximately 1,200 units. However, taking into account the demolition of 297 units and the development of Brook House delivering 222 units, the total number of units is 1,125. However planning permission has not yet been granted for...
the High Road West scheme.

3.9.25 In the absence of a planning permission (or a planning application) High Road West has only been taken into consideration within the cumulative impact assessment of Air Quality, Noise and Traffic matters as it is only possible to make reasonable assumptions in respect of these topics. A sensitivity test was undertaken for Traffic chapter based on the masterplan area delivering 1,125 units, which has been taken into account within the Air Quality and Noise assessments.

**Construction Compound - Cumulative Development Consideration**

3.9.26 The current position that has been assessed is for materials to be transported to and from the Project Site from the A1010 via the M25. However, a temporary Construction Compound at White Hart Lane Depot, 46-48 White Hart Lane, N17 8DP has been proposed as an option by the Club to support the construction phase of the Stadium (Phase 1 and 2). A separate planning application will be submitted for this proposal simultaneously with this application.

3.9.27 The potential quantitative effects that may arise from pursuing the option of the use Construction Compound have been considered with regard to Air Quality, Noise and Traffic impacts. In particular impacts that may arise from construction vehicle trips to and from the Construction Compound and Project Site and associated impacts on the A1010 have been considered. The ES assesses impacts in these topic areas both with and without the use of the Compound. It is considered that the Construction Compound is unlikely to give rise to significant impacts within the remit of any other disciplines.

3.9.28 The site may be utilised as a temporary construction compound that could potentially allow the construction of the Stadium to be undertaken more efficiently. The site would principally provide the following facilities:

- Site Reception;
- Site Management Offices;
- Welfare Facilities;
- Material Storage Area; and
- Concrete Batching Plant.

3.9.29 The site would be secured by 2.4m hoarding and manned 24 hours a day.
4. Description of the Project

4.1 The Need for the Project

4.1.1 The Club has already secured the necessary approvals to enable the development of a new stadium and associated developments on the Project Site. However, this process has taken over 7 years, during which time there has been a change in the Club’s requirements (including technical requirements and specifications for a world class stadium).

4.1.2 In the intervening period the context for development and regeneration in the local and wider area has changed. The Council and the GLA are tasked with facilitating the regeneration of Tottenham with a focus on delivering in excess of 10,000 new homes in the wider area over a 20 year period. This is level of regeneration that was not anticipated at the time of the inception of consented applications and therefore this Project seeks to respond to the changing context.

4.1.3 The Club appointed a new design team with Populous appointed for their specialism in stadium and sports related development and Allies & Morrison appointed for the experience in residential buildings.

4.1.4 Key factors in the need for the for the Project include:

- The need to place the stadium in its heritage context in a more holistic manner;
- The need to improve crowd safety;
- The need to expand the multi use nature of the stadium, and
- The need to improve the overall viability of the Project.

4.2 The Planning Application

4.2.1 The planning application includes the Project Site as shown on Drawing POP-4494-PLN-GA-0119-00 which illustrates both the Planning Application Boundary (Appendix 1.1). The planning application is a hybrid application in that it contains both full and outline elements – the outline elements are shown edged green on Drawings POP-4494-PLN-GA-0120-00 to POP-4494-PLN-GA-0140-00.

4.2.2 As well as the planning application a Listed Building Consent application has been submitted in relation to work to Warmington House.

4.2.3 As set out in the Planning Application, the description of the Project is as follows:

4.2.4 "Proposed demolition and comprehensive phased redevelopment for stadium (Class D2) with hotel (Class C1), Tottenham Experience (sui generis), sports centre (Class D2); community (Class D1) and / or offices (Class B1); housing (Class C3); and health centre (Class D1) together with associated facilities including the construction of new and altered roads, footways; public and private open spaces; landscaping and related works. Details of “appearance” and "landscape” are reserved in relation to the residential buildings and associated community and / or office building. Details of "appearance” and “scale” are reserved in relation to the sports centre building. Details of “appearance” are reserved in relation to the health centre building.”
4.2.5 *Appearance* (the aspects of a building or place which determine the visual impression it makes, excluding the external built form of the development) and *Landscape* have been reserved in relation to the residential towers. Matters submitted for detailed approval include *Layout* (where the blocks sit on the site and relation to other buildings), *Scale* (the height, width and length of each building proposed in relation to its surroundings) and *Access*.

4.2.6 *Appearance, Landscape and Scale* have been reserved in relation to the Sports Centre and the Community Health Building. Matters submitted for detailed approval include *Layout* and *Access* (where the building is accessed from the street and Podium).

4.2.7 Full planning permission is sought for the Stadium, the Tottenham Experience and the Hotel. Outline permission is sought for the Residential, Sports Centre and the Community Health Building.

<table>
<thead>
<tr>
<th>Full Permission</th>
<th>Outline Permission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stadium (Inc. Podium)</td>
<td>Residential (Inc. Plinth)</td>
</tr>
<tr>
<td>Tottenham Experience Centre</td>
<td>Sports Centre</td>
</tr>
<tr>
<td>Hotel</td>
<td>Community Health Building</td>
</tr>
</tbody>
</table>

### 4.3 The Project

4.3.1 The Project involves the comprehensive redevelopment of the Project Site, including demolition of the existing Stadium and a number of other buildings, with the exception of Warmington House. See Paragraph 4.3.13 for further detail.

4.3.2 The below Tables set out the details of each development component of the Project. The development components are the following:

- The Stadium (including the Podium);
- The Tottenham Experience (including Warmington House);
- The Hotel;
- The Sports Centre;
- The Community Health Building; and
- The Residential Towers and Flexible Community / Office Space within the Plinth.

#### 1. Stadium

| Description | The Project will see a number of changes to that of the existing and consented Stadium. It has been proposed to enhance the Stadium’s capacity from the consented scheme by 4,850 with the height increasing by 4m. The existing Stadium has a capacity of 36,284 and is approximately 22-24m in height. As well as the Stadium being used to host THFC matches, the Stadium has been designed to accommodate a number of concerts and non-football related events throughout the year including NFL matches. There will be a ‘Skywalk’ at the top of the Stadium which will be an attraction for supporters and tourists/visitors. |

Tottenham Athletic Football Club Limited

September 2015

4.2
<table>
<thead>
<tr>
<th><strong>Total Floorspace (GIA) sqm</strong></th>
<th>119,945</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum Height</strong></td>
<td>48m to the eaves from pavement level (High Street) Maximum height of roof is 59.154 AOD</td>
</tr>
<tr>
<td><strong>Capacity (seats)</strong></td>
<td>The headline stadium capacity figure of the purposes of this EIA is <strong>61,000</strong>, which is based upon the number of seats that can be sold. In common with all sports stadia, the precise capacity will vary from event to event depending upon the configuration adopted for each event. When account is taken of media seats and seats associated with playing staff, the operational capacity will rise to <strong>61,461</strong>.</td>
</tr>
<tr>
<td><strong>Events</strong></td>
<td>Annually, there will be 30 Football Matches (THFC events) (typically, but not limited to). In addition, there will be a total of 16 non-THFC events per annum comprising: 10 Other Major Events (at least 2 of which will be NFL matches); and 6 Concerts.</td>
</tr>
<tr>
<td><strong>Car Parking</strong></td>
<td>822 spaces comprising: 732 standard spaces 90 fully accessible spaces 60 blue badge spaces Access and egress from Worcester Avenue.</td>
</tr>
<tr>
<td><strong>Cycle Parking</strong></td>
<td>Already included as part of the Lilywhite House development</td>
</tr>
<tr>
<td><strong>Lighting</strong></td>
<td>Floodlighting will be provided to meet the requirements for English Premier League football and Category 3 recommendations for high definition television (HDTV), with 1,650 lux vertical illuminance value in the direction of the main fixed cameras in the West stand, and a 1,200 lux in direction of secondary fixed cameras in the East stand. Intermediate levels of illuminance will also be provided for reserve fixtures and training, while enhancements will be included for UEFA Champions League (Group Stage) and American Football (NFL) matches. Floodlighting lamps will be fixed to the secondary roof trusses around the pitch on all sides, angled to ensure the players, spectators and broadcasters are not subjected to unacceptable levels of glare. The field of play floodlighting is highly directional and is located within the roof and below the eaves line, so light spill to the surrounding area will be minimised.</td>
</tr>
<tr>
<td><strong>Screens</strong></td>
<td>The internal HDTV screens are as follows: The South screens (2no.) will be 29.05m x 10.9m and the 2no. screens to the north are 22m x 8.25m. The main TV camera gantry is at the front of the upper tier west and secondary cameras distributed as required by EPL and UEFA Champions League.</td>
</tr>
</tbody>
</table>
The external screen is a low res LED stick and/or puck system incorporated into the Perforated Aluminium Cladding panels on the west elevation, with dimensions of 8.2m high and 15 wide. Beyond the screen dimensions the LEDs produce a lighting effect covering a proportion of the perforated panels on the west elevation.

Podium

The podium will be 4 storeys (Including 2 basement levels).

All residents and visitors to will have access to the play and other outdoor amenity spaces on the podium level of the Stadium, as well as a piazza outside the Stadium entrances. The podium and other areas of public realm have been designed to connect the site with its surrounding area. The podium and other area of public realm will be designed to manage crowd movements on match days (enabling the Stadium to meet its 8 minute evacuation time providing an area for supporters to converge) with the provision of new public spaces. On non-match days there will be complete permeability across the site between the High Road and Worcester Avenue. With the exception of the north-east service access, there will be complete public access around the Stadium.

2. Tottenham Experience

<table>
<thead>
<tr>
<th>Description</th>
<th>The Tottenham Experience incorporates the existing Grade II Warmington House. This building will be accessed from High Road and will comprise a shop for Spurs merchandise and a showroom/museum of the football clubs history and achievements.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Floorspace (GIA) sqm</td>
<td>4,311</td>
</tr>
</tbody>
</table>
| Floorspace Breakdown (GIA) sqm | Megastore – 1,955  
Museum – 728  
Café – 260  
Cinema – 400  
Ticket Office – 242  
Skywalk Change and Reception – 100 |
| Maximum Height | 14.1m above ground  
25.1 AOD |
| Storeys | 3 |
| Car Parking | No car parking spaces will be allocated for the Tottenham Experience |
| Cycle Parking | Already included as part of the Lilywhite House development |

3. Hotel

| Description | A hotel will be located on the corner of Park Lane and High Road (south-western corner of the site). As with the Sports |

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4. Sports Centre

Description

A Sports Centre will be located to the west of the residential blocks fronting Park Lane and will be accessible from the different levels from both Park Lane and the podium. This includes a Multi-Use Games Area (MUGA), and an indoor/outdoor extreme sports facility with climbing walls and a diving pool.

A gym associated with the Extreme Sports centre will provide further local recreation facilities, accessed both from street level and the podium adjacent to the westernmost Tower D.

Total Floorspace (GIA) sqm 2,100

Maximum Height

51.2m above ground
62m AOD

Storeys 7

Car Parking No car parking spaces will be allocated for the Sports Centre

Cycle Parking 8 racks for 16 cycles along Park Lane

5. Community Health Building

Description

The Project includes a building to the north-east of the site that will accommodate a Health Centre. The ground floor of this building will be used for servicing of the Stadium. Levels 1 and 2 will be used as a community health centre. The roof of this building will accommodate plant for the Stadium which will include generators and air vents.

Total Floorspace (GIA) sqm 2,000

Maximum Height 21m above ground level
31.8m AOD

Storeys 2

Car Parking No car parking spaces will be allocated for the Community Health Building
6. Residential

Description

The Project comprise a cluster of four residential towers of varying height above a three storey plinth in the southeast corner of the Stadium redevelopment site. 25m x 25m and 25m x 30m masonry clad rectangular towers with recessed balconies are proposed.

The tallest Tower C in the centre of the group is set back from both Park Lane and Worcester Avenue to minimise the visual impact and overshadowing of the immediate setting.

Each flat has been designed with a private inset or semi-recessed balcony. Additionally, the Project includes private and semi-private open space for the residents. Rooftop ‘sky gardens’ are proposed within the chamfered roof form at the tops of each tower, providing external amenity space for all residents to enjoy.

In addition to 5 townhouses, a total of 580 units will be split across blocks A, B, C and D set out in the below table.

All Apartments with the exception of 2 no. Studio units and 3 no. 2 Bed units have private balconies or wintergardens; Area calculation as follows: 5m2 min (for studio or 1 bed) + 1m2 per each additional occupant in unit.

There will be Community and / or Office space at ground, first and second floor (within the Plinth, as per consented scheme).

Car parking and cycle parking spaces will be accommodated over first, ground, basement and lower basement levels of the Plinth.

<table>
<thead>
<tr>
<th>Flexible Community Office Use</th>
<th>3,897 over ground, first and second floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communal Amenity Space / Playspace</td>
<td>There will be a total of 2,695 sqm of Community Amenity Space, which is inclusive of playspace: Residential Plinth: 1,835sqm* Roof Gardens: 860sqm**</td>
</tr>
<tr>
<td>Brown Roof</td>
<td>1,090 sqm</td>
</tr>
<tr>
<td>Total No. of Units</td>
<td>585 (including 5 x 3 bed Townhouses)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicative Unit Mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
Maximum Height

<table>
<thead>
<tr>
<th>Tower</th>
<th>Height Above Ground</th>
<th>AOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower A</td>
<td>94m</td>
<td>104,620m</td>
</tr>
<tr>
<td>Tower B</td>
<td>67m</td>
<td>78,220m</td>
</tr>
<tr>
<td>Tower C</td>
<td>121m</td>
<td>131,020m</td>
</tr>
<tr>
<td>Tower D</td>
<td>69m</td>
<td>80,220m</td>
</tr>
</tbody>
</table>

Storeys

<table>
<thead>
<tr>
<th>Tower</th>
<th>Storeys Above Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower A</td>
<td>24</td>
</tr>
<tr>
<td>Tower B</td>
<td>16</td>
</tr>
<tr>
<td>Tower C</td>
<td>32</td>
</tr>
<tr>
<td>Tower D</td>
<td>16</td>
</tr>
</tbody>
</table>

Car Parking

- Tower A: 243 (216 standard and 27 Blue Badge Holders)
- Tower B: 31
- Tower C: 31
- Tower D: 16

In total, there will be 0.47 parking spaces per dwelling.

Cycle Parking

- 882

Plinth

- The plinth will be 4 levels (including 2 lower basement levels).
- Courtyard roof gardens are provided at raised plinth level, which will incorporate local play space and landscaped outdoor garden spaces (Drawing No. 1007-SK_002 in Appendix 1.1 set out details of Amenity Space and Ecological planting).
- There will be up to 3,897 sqm (GIA) of commercial floorspace located partially at ground and first floor level, with the substantive element at second floor level.
- Access from the Plinth down to basement levels provides access for residents to recycling and refuse storage spaces, plant rooms and car and cycle parking areas.
- Additionally, a members' club with a bar, lounge and spa facility for residents and local neighbours is proposed at Plinth level 2. This will be accessed directly from street and main podium levels, and will feature landscaped courtyards providing daylight and planted spaces. Courtyard roof gardens are provided at raised plinth level, which will incorporate local play space and landscaped outdoor garden spaces.

4.3.3 All Application Drawings are set out within Appendix 1.1 which includes the relevant drawing schedules.

4.3.4 In summary, the Project will deliver the following floorspaces:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Use Class</th>
<th>Area GIA (sqm)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leisure (including stadium)</td>
<td>D2</td>
<td>122,000</td>
<td>n/a</td>
</tr>
<tr>
<td>Residential</td>
<td>C3</td>
<td>49,000</td>
<td>585 (max)</td>
</tr>
<tr>
<td>Sui Generis / Tottenham Experience</td>
<td>Sui Generis</td>
<td>4,311</td>
<td>n/a</td>
</tr>
<tr>
<td>Business</td>
<td>B1</td>
<td>4,000 (max)</td>
<td>n/a</td>
</tr>
<tr>
<td>Community and Culture</td>
<td>D1</td>
<td>4,000 (max)</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Fan Zones

4.3.5 During NFL events, Fan Zones are anticipated to be set up which will be in situ before, during and after the match. The public and ticket holders will be able to congregate in these areas which will accommodate a number of facilities including food and beverage, potentially music and family friendly events.

4.3.6 It is currently anticipated that one of these Fan Zones will be hosted on the Southern Podium, and other locations are being investigated by the Club and Haringey Council. The delivery of these Fan Zones will be subject to the grant of appropriate licenses, and where necessary separate planning permission (although they may constitute permitted development).

4.3.7 Further details of the Fan Zones (including the hours of operation, likely number of attendees and range of activities) are unknown at the time of submitting this planning application, therefore it has not been possible to assess these areas as part of the ES. However, given the temporary nature and type of facilities being investigated, it is not anticipated that they will have the potential to give rise to significant effects. When further information is made available, these areas can be taken into further consideration, for example, through an EIA Screening where appropriate.

4.3.8 Further details of the Fan Zones are set out within Section 6.9 of the Design and Access Statement.

Public Realm / Landscaping

4.3.9 The public realm stretches around all sides of the Project site, connecting the stadium with the other buildings in the Southern Development and the community health centre. The landscaping arrangements includes new streetscapes running along the perimeter of the site as well as areas of podium to the north and south of the Stadium. The south podium incorporates a new public square intended to host a variety of sports and community uses, as well as connecting the wider regeneration areas to the east and west of the site.

4.3.10 The Southern Podium will incorporate a number of features, including a Multi-use hardcourt zone, tiered planter benches, a water feature, abseiling ‘landing pad’ and a nature garden.

4.3.11 New trees and landscaping will be incorporated along High Road, Park Lane, Worcester Avenue, Square and podium levels. The materials that will be used throughout the public realm will include (but will not be limited to) York Stone, Granite and resin bound gravel.

4.3.12 Details of the landscaping are illustrated on Drawing No. POP-4494-PLN-GA-8000 (Appendix 1.1), and are set out within Chapter 13 of the Design and Access Statement that has been submitted with this planning application.

Heritage Assets

4.3.13 It is proposed that Number 744 High Road (Warmington House) will be retained as part of the Project. Numbers 750 High Road (formerly Valentino’s Nightclub), 748 High Road (Redhouse Coffee Palace) and 746 High Road (Edmonton Dispensary) are proposed to be demolished. Number 750 High Road is a
public house with all floors of the property in this use. Number 748 High Road includes a coffee shop at ground floor with club meeting room and administrative offices above. Numbers 746 and 744 High Road are used by the Club as offices ancillary to the Stadium. Number 744 High Road (Warmington House) is a Grade II listed building. Numbers 746, 748, 750 are locally listed buildings.

4.3.14 Further justification for the loss of the 3 locally listed buildings is set out within the Crown Safety Matrix, a detailed assessment undertaken by Movement Strategies on behalf of THFC (Appendix 4.5) and also within the Planning and Heritage Statement forming part of the planning application. This is discussed in further detail in this Statement.

Accessibility

Pedestrians and Cyclists

4.3.15 Pedestrian improvements are focussed on the provision of large open spaces around the Stadium which increase the permeability of the Project Site compared with the existing situation. However improved crossing facilities are proposed at the Northumberland Park / High Road junction and at the Park Lane / High Road junction; these are described below. Improvements are also proposed to Worcester Avenue as part of the landscaping proposals for the Project and these are described in the next section.

4.3.16 The Project will result in changes to the cycling network and facilities. These include the removal of Paxton Road from the centre of the site, resulting in the loss of a cycling route. However, there will be an increase in the number of lanes on Northumberland Park adding capacity to the street and secure, covered cycle parking facilities across the site. This will result in a significant increase in cycle parking provision. Cycle access to the buildings and the site will be provided from High Road, Northumberland Park, Worcester Avenue and Park Lane.

Highway Arrangements

4.3.17 Paxton Road and Bill Nicholson Way (together will two small sections of the High Road) were stopped up earlier in 2015. Access to the Project Site will be provided from High Road, Northumberland Park, Worcester Avenue and Park Lane. There will be an overall reduction in vehicular accesses across the site.

4.3.18 A new junction will be created to establish an access point into the basement for the Stadium and Hotel car parking. A servicing access point will be created at the north-east of the Stadium providing an access point for service vehicles. Furthermore, a new junction will be created on Worcester Avenue to create an access into the car park in the lower levels of the Plinth.

4.3.19 There will be the creation of two new pedestrian crossings across High Road opposite Moselle Place and Brereton Road.

4.4 Sustainability

4.4.1 A Sustainability Statement has been submitted with this ES (Appendix 4.1) which sets out the objectives and deliverables for the construction and operation of the Project in order to communicate the measures implemented to ensure sustainable development.
4.4.2 To ensure sustainable development, the specification of new construction materials will prioritise those with minimal environmental impact associated with their use and that are economically feasible. Where possible and appropriate, the Project will aspire to meet the following targets:

- Use of environmentally sensitive, non-toxic building materials;
- Use of materials and products that have low Volatile Organic Compounds (VOC);
- Use of insulation materials and refrigerants with low Global Warming Potential (GWP);
- Use of insulation materials and refrigerant with zero Ozone Depletion Potential (ODP);
- Minimising use of new aggregates whilst promoting the use of recycled crushed aggregates (RCA);
- Specifying materials that are graded B-upwards in the BRE Green Guide to Specification; and
- No use of materials proscribed in the Montreal Protocol.

4.4.3 In addition to the above, the Project will commit to the following:

- All contractors will develop and implement a Construction Environmental Management Plan for each site (see Section 5.6);
- All contractors will develop and implement a Construction Waste Management Plan for each site (see Section 5.7);
- All sites will be registered under the Considerate Constructors Scheme; and
- All demolition work will adhere to The ICE Demolition Protocol.

4.4.4 To further ensure sustainable development, all major non-domestic developments will achieve a ‘Very Good’ rating as a minimum under the most up-to-date BREEAM or equivalent scheme. The report states that the BREEAM 2014 New Construction (NC) will be used to assess the non-domestic buildings within the Project individually.

4.4.5 Further to the above, the Sustainability Report summaries how the environmental sustainability objectives for the Project will be delivered by a series of strategies addressing the various environmental issues. The report summarises the conclusion of the individual technical reports that have been submitted with this ES, which includes the Energy Strategy, Water Strategy and Utilities Report that are summarised in Sections 4.4 to 4.7 of this ES.

4.5 Energy

4.5.1 In accordance with relevant policies, energy efficiency of the Project has been achieved through following the energy hierarchy. The approach aims to minimise energy consumption from the outset through the use of low energy, passive measures and efficiency systems before the deployment of low and zero carbon technologies.

4.5.2 The key components of the strategy are illustrated below, while a full detailed description can be found in the Energy Statement which accompanies this document. This includes the renewable and low carbon energy assessment and Part L energy modelling results. Further details are set out within Appendix 4.2.

4.6 Water

4.6.1 The proposed water strategy shall follow a hierarchical structure to minimise the potential impacts of the
Project on the local natural resources and existing infrastructure. The approach taken is to reduce water demand as far as possible at source, before considering efficient fixtures and fittings, efficient distribution and alternative sources for lower grade uses. Importantly, given the nature of the site, the strategy will also tie in with a site-wide sustainable drainage strategy which incorporates the use of sustainable drainage systems (SUDS).

4.6.2 A summary of the measures that will be taken to reduce the Projects water demand are set out below, however further information is set out within Appendix 4.3:

- Improved Efficiency at Point of Use: As illustrated in Table 4.2 of the Sustainability Report (Appendix 4.1), the NDP proposes to use water efficient fittings that are overall, significantly more effective than the guidance given by BREEAM; and
- Increase system efficiency: Improvements in the design and distribution of the water system can reduce leakages and losses across site. Intelligent design that reduces the number of dead legs and minimises overall distribution lengths shall be sought, whilst additional features such as flow restrictors and pressure reducing valves will be considered. The use of metering for all substantial uses and leak detection linked to a Building Management System (BMS) will be encouraged to enable close monitoring and management of water use.

**Drainage**

4.6.3 The site currently drains to separate surface water and foul sewers. The Project will maintain the separation and connect into these networks. Local network upgrades will be made on Worcester Avenue with the addition of a new sewer. This is important in terms of managing the impact of the increase in discharge as a result of the increase in Stadium capacity. The installation of water efficient fittings will further minimise the increase in discharge volume.

4.6.4 The surface water drainage of the site will aim to improve the existing situation through the introduction of SUDS across the site. This will provide attenuation of storm water to reduce the flood risk to the downstream catchments as well as to the Project itself.

4.6.5 As a result of this approach the site-wide surface water discharge will be reduced from the current rate of 284l/ha/s to 150 l/ha/s. The surface water drainage strategy has been approved in principle by the EA, Thames Water Utilities (TWUL) and Haringey Council.

4.6.6 The foul drainage of the Project will connect into the existing network and upgrades will be provided to ensure that the systems do not back up and avoid exceeding existing network capacity. The Stadium will drain into the High Road sewer to the west, the hotel and residential development to the South to Park Lane. The foul water drainage strategy will require a pumped system and has been approved in principle by TWUL.

4.6.7 Extensive consultation, has taken place between the design team and the Environment Agency (EA). The EA are aware of the Project and have confirmed informally their approval of the proposals. They acknowledge that the reduction of the surface water run-off rate from 284l/s/ha to 150l/s/ha represents a significant improvement and welcome the reductions in water usage that have been demonstrated against the baseline demands.
Flood Risk

4.6.8 As set out in Section 3.8.7 of this ES, the site is located in EA Flood Zone 1. The provision of surface water attenuation will significantly reduce the risk of surface water flooding for the site. A controlled discharge rate from the underground storage tanks will also reduce the risk of the Project surcharging the surface water drainage network and impacting on third parties.

4.6.9 The Flood Risk Assessment Report has been submitted with this application (Appendix 10.1).

Utilities

4.7.1 A Utilities Planning Report (August 2015) has been prepared and submitted with this ES (Appendix 4.4). The utilities will be provided in stages for the Project to suit the phasing of construction. The Project can be served with all utilities, however there will be off site strengthening required to some utilities as described below:

Electricity

4.7.2 The required HV electric supply requires strengthening of the strategic UKPN networks at Bruce Grove; this is already in hand as an independent UKPN project due for completion in early 2017. A new 11kV cable route is to be laid from Bruce Grove substation to the site area to provide supply.

Water Supply

4.7.3 The potable water supply for the Stadium is to be provided from the existing distribution network in the High Road. Strengthening is required, however this consists of opening an existing valve to allow a greater flow from the existing trunk main to the local distribution network.

Telecommunications

4.7.4 The telecoms and broadband services to the Stadium and the other parts of the Project will be provided from the existing infrastructure in the streets around the Stadium. Strengthening may be required depending on which providers are use but this will be arrange and carried out by the provider.

4.7.5 Existing utilities serving the existing Stadium will be kept in place until the Stadium goes out of use and removed at that stage.

Gas

4.7.6 The gas supply for the Stadium is to be taken from the existing low pressure main in the High Road and National Grid Gas have confirmed there is sufficient capacity with no strengthening.

Waste

Construction Waste

4.8.1 Tottenham Athletic Football Club Limited are committed to a strategic approach to managing materials and construction materials and ensuring the impact on the environment is minimised by reducing amount sent to landfill. Section 5.7 of this report sets out further information on construction waste.
Operational Waste

4.8.2 A Waste Management Policy has been prepared which has informed this ES (see Appendix 2.1). THFC is committed to manage its waste in line with the waste hierarchy, as shown in Appendix 2.1, and other relevant national and local legislation and guidance.

4.8.3 The Club recognises that in order for the buildings to operate in a productive and efficient manner good waste management is required. A meeting with THFC staff and the design team was held on 12th February 2015 to discuss the preliminary waste management aims and aspirations. THFC have produced the Waste Management Policy to ensure that all waste generated is disposed of safely and efficiently to ensure good waste management.

4.9 Comparison of Consented and Proposed

4.9.1 A comparison of the existing planning permission and the emerging proposals is set out below:

Table 4.2: Comparison between Consented and Proposed

<table>
<thead>
<tr>
<th></th>
<th>Consented</th>
<th>Emerging Proposals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of Units</td>
<td>285</td>
<td>585</td>
</tr>
<tr>
<td>Number of Blocks</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Open Space (communal for exclusive use of residents)</td>
<td>2,900 sqm</td>
<td>2,695 sqm</td>
</tr>
<tr>
<td>Storeys</td>
<td>Up to 12 storeys</td>
<td>From 16 and up to 32 storeys</td>
</tr>
<tr>
<td>Parking</td>
<td>200</td>
<td>243</td>
</tr>
<tr>
<td><strong>Health Centre and/or Health Club and/or College (Class D1 or D2)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floorspace</td>
<td>Up to 15,000 sqm</td>
<td>Not part of current scheme</td>
</tr>
<tr>
<td>Storeys</td>
<td>3 - 12</td>
<td></td>
</tr>
<tr>
<td><strong>Community Health Building (North-East Building)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floorspace</td>
<td>Not part of previous scheme</td>
<td>2,000 sqm</td>
</tr>
<tr>
<td>Storeys</td>
<td>3 - 12</td>
<td></td>
</tr>
<tr>
<td><strong>Tottenham Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floorspace Height above site ground level</td>
<td>Not part of previous scheme</td>
<td>4,311 sqm</td>
</tr>
<tr>
<td>Storeys</td>
<td>3 storeys</td>
<td></td>
</tr>
<tr>
<td><strong>Extreme Sports Centre</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floorspace</td>
<td>Not part of previous scheme</td>
<td>2,100 sqm</td>
</tr>
<tr>
<td>Height</td>
<td>7 storeys</td>
<td></td>
</tr>
<tr>
<td><strong>Stadium</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>56,250</td>
<td>61,000</td>
</tr>
<tr>
<td>Height</td>
<td>42m above site ground level</td>
<td>45m above site ground level</td>
</tr>
<tr>
<td>Parking</td>
<td>Car Parking Spaces – 319 associated with the Stadium, of which 18% would have been accessible</td>
<td>Car Parking Spaces – 822 associated with the Stadium, of which 18% will be accessible</td>
</tr>
<tr>
<td>Events</td>
<td>26 THFC Football</td>
<td>30 THFC football</td>
</tr>
</tbody>
</table>
### 4.10 Alternative Locations and Options

#### Alternative Locations

4.10.1 The EIA Regulations do not require the full assessment of all potential alternatives, only a reasonable account of those actually considered by the developers prior to submission of the planning application.

4.10.2 Alternative development options within EIA are often considered primarily in terms of location, however, the Club has a long history within Tottenham and is seen by many as an integral part of Tottenham. In addition, the Council has expressed a desire to have the Club remain in Tottenham and has acknowledged the regeneration potential offered by the Project. A permanent move away from Tottenham would have an immediate and profound financial affect on the area and would seriously undermine the Council’s regeneration initiatives for the area. The Club are not looking at alternative locations and wish to redevelop their existing site. Therefore it is not necessary to consider alternative locations to deliver the project.

#### Alternatives Options

4.10.3 There are limited realistic options that have been considered by the developers prior to submission of the planning application: the Consented Scheme could be considered to be an alternative option as it has the benefit of planning permission. The design process was an iterative process whereby different design and massing were explored before. This is detailed within the Design and Access Statement which is submitted with the application documentation. For completeness some keys points of this process have been set out below in Option 2,

I) **Option 1: Consented Scheme**

4.10.4 The consented scheme would see the stadium built out at a capacity of 56,250 together with associated development including housing (285 residential units) (permission references HGY/2010/1000 and HGY/2010/2351). This scheme, designed by KSS (see Figure 4.1), and the subsequent amendments to the scheme were fully assessed under EIA and Environmental Statements where submitted with the submission and as such it is not considered appropriate to duplicate the assessments here.
II) Option 2: The Project

4.10.5 As set out in Section 4.1 (The Need for the Development), the consented scheme design has its origins back in 2007, with the stadium design finalised in 2010, at which point a planning application was submitted and subsequently approved in 2011. However it was not until earlier this year (2015) that the Club had secured all the relevant statutory approvals (in particular the resolution of a legal challenge to a compulsory purchase order) to allow it to commence with construction of the development.

4.10.6 During this significant delay the regeneration context for the Project has changed considerably and so too has the Club’s own requirements for the stadium and associated development, as well as the technical requirements and specifications demanded for world class stadia. Details of the change of the regeneration context are set out in the Planning Statement.

4.10.7 Responding to this changing context, the Club appointed a new design team of market leading design specialists, including Populous (stadia and sports related development); Allies & Morrison (residential); and Donald Insall Associates (heritage architects and advisors).

4.10.8 As part of their design review of the consented scheme Populous sought to investigate ways to improve the crowd safety along the High Road. Movement Strategies where brought on board as crowd safety specialists who considered the consented scheme unsafe in terms of crowd movement along the High Road. In order to address this the design team, with input from heritage specialists Donald Insall Associates, explored the option to demolish the three locally listed building but to retain and incorporate Warmington House into the scheme (the Tottenham Experience).

4.10.9 Allies and Morrison leading the design of the southern residential buildings, explored ways to increase the scale of the residential buildings. Details of the design evolution are set out clearly in the Design and Access Statement and it is not considered appropriate to assess them further as part of consideration of
alternatives.

4.10.10 The result of the design process is the scheme that is submitted for planning and is assessed as part of this Environmental Statement. An illustration of this scheme is shown in Figure 4.2 below.

**Figure 4.2: Option 2 Illustration**

![Illustration of the scheme](image)

4.10.11 Details of the design evolution are set out clearly in the Design and Access Statement and it is not considered appropriate to assess them further as part of consideration of alternatives.

4.11 Assessment Scenarios

4.11.1 The following scenarios have been assessed within this ES:

- Baseline - This is the Application Site conditions as existing;
- Future Baseline With the Project; and
- Future Baseline with the Project plus Committed Developments.
5. Construction, Phasing and Implementation

5.1 Overview

5.1.1 Construction methods are influenced by a combination of factors. These include the existing ground conditions and the preferred methods of the building contractor that will be appointed. While a detailed construction programme for the delivery of the Project has not yet been established, it is possible to describe a generic construction methodology based on anticipated construction methods and timings derived from similar development projects in similar locations.

5.1.2 This enables the identification of potentially significant effects at the construction stage and enables suitable mitigation measures to be identified. Clearly these assumptions need to be realistic and appropriate to the Project and many will ultimately be defined in a Construction Environmental Management Plan (CEMP).

5.1.3 The construction of the enabling elements of the Project can be undertaken in large part independently of the construction of the Stadium and podium. However, all elements require certain works to be carried out in advance of the construction. These are the remediation of contamination in accordance with the remediation strategy proposed for the site subject to any amendments agreed with the Environment Agency and the Council, demolition of structures around the Stadium. Together these works are referred to as the site preparatory works.

5.2 Site Preparation Works

Remediation Strategy and Methodology

5.2.1 A remediation strategy will be agreed for the site in accordance with DEFRA/Environment Agency (2004), Model Procedures for the Management of Land Contamination (CLR11). The strategy will be implemented through a site specific Construction Environment Management Plan (CEMP) which will need to be completed by the contractor prior to construction. This will be reviewed regularly to best suit the practices being undertaken on site.

Earthworks

5.2.2 As part of the earthworks the site area is to be excavated to construction platform level and from this level the basement excavation will be undertaken. These works will involve cutting materials and the cut materials will have the following fates: i) re-use as part of an offsite noise bund, ii) disposal to suitably licensed landfill and iii) washing and re-use on site in permanent works concrete and as part of the piling mat.

5.2.3 The re-use on site of natural gravels following washing as part of the permanent works concrete will significantly reduce the volume of material that needs to be exported from the site and imported as part of the construction process. It is estimated that approximately 31,000m$^3$ of material will be reused on site.

5.3 Construction Programme

Phasing

5.3.1 Table 5.1 indicates that there are three key phases to deliver the Project; Phase 1, 2 and 3. Phase 1 will
be the construction of the northern section of the Stadium around the existing White Hart Lane, during which the existing Stadium will be demolished. The North-east building will also be construction during this phase. Preparatory works are underway for this phase pursuant to existing permission.

5.3.2 **Phase 2** will be the construction of the southern section of the Stadium and the associated podium. This phase will also include the installation of the new retractable pitch. On completion of this phase in 2018, the Stadium will be fully operational.

5.3.3 The Tottenham Experience will also be constructed and operational at the same time as the Stadium.

5.3.4 **Phase 3** will be the final phase of development which will commence after the completion of Phase 2, with construction work commencing during the operation of the Stadium. The four residential towers and associated landscaping will be constructed during this phase, along with the extreme sports centre and hotel.

5.3.5 The Project is intended to be construction between 2015 and 2022. The total construction phase is expected to take approximately 75 month to December 2021.

**Programme**

5.3.6 Under the current programme, construction and associated activates are to be ongoing until 2021.

5.3.7 The Project is to be undertaken in three phases taking into account the construction of the Stadium, the North-East buildings and the various elements of the Southern Development.

5.3.8 Table 5.1 below sets out the indicative construction phases for the Project. The below programme is based on 12 hour working days, 7 days a week (see Paragraph 5.4.33 for construction working hours).

**Table 5.1: Construction and Phasing Programme**

<table>
<thead>
<tr>
<th>Description</th>
<th>Start date</th>
<th>Anticipated Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase 1 – Stadium Phase (A)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground excavation and remediation</td>
<td>September 2014</td>
<td>October 2015</td>
</tr>
<tr>
<td>Test Piles, steel sheet piling, dewatering, propping, gravel washing,</td>
<td>March 2015</td>
<td></td>
</tr>
<tr>
<td>concrete batching, concrete piles and pile caps.</td>
<td></td>
<td>Test Piles – complete</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sheet Piles – complete</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gravel washing – November 2015</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concrete piles – January 2016</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concrete Batching – January 2016</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pile Caps/propping</td>
</tr>
<tr>
<td>Project Description</td>
<td>Start Date</td>
<td>End Date</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Vacant Possession of Archway Sheet Metal Works</td>
<td>October 2015</td>
<td></td>
</tr>
<tr>
<td>Construction of New Stadium (northern section) around an operational White Hart Lane</td>
<td>March 2016</td>
<td>February 2018</td>
</tr>
<tr>
<td>Community Health Building (North-East Building)</td>
<td>2016</td>
<td>2017</td>
</tr>
<tr>
<td>Demolition of White Hart Lane</td>
<td>May 2017</td>
<td>October 2017</td>
</tr>
</tbody>
</table>

**Phase 2 – Stadium Phase (B)**

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground excavation and remediation</td>
<td>May 2017</td>
<td>September 2017</td>
</tr>
<tr>
<td>Test Piles, steel sheet piling, dewatering, propping, gravel washing, concrete batching, concrete piles and pile caps.</td>
<td>June 2017</td>
<td>October 2017</td>
</tr>
<tr>
<td>Pilling</td>
<td>July 2017</td>
<td>October 2017</td>
</tr>
<tr>
<td>Completion of New Stadium (southern section) and podium</td>
<td>May 2017</td>
<td>August 2018</td>
</tr>
<tr>
<td>Construction of THFC Experience</td>
<td>May 2017</td>
<td>August 2018</td>
</tr>
<tr>
<td>New Stadium fully Operational</td>
<td>August 2018</td>
<td></td>
</tr>
</tbody>
</table>

**Phase 3 – Mixed-use Phase**

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground excavation and remediation</td>
<td>May 2017</td>
<td>January 2019</td>
</tr>
<tr>
<td>Test Piles, steel sheet piling, dewatering, propping, gravel washing, concrete batching, concrete piles and pile caps.</td>
<td>August 2018</td>
<td>April 2019</td>
</tr>
<tr>
<td>Piling</td>
<td>September 2018</td>
<td>July 2019</td>
</tr>
<tr>
<td>Construction of Hotel</td>
<td>January 2018</td>
<td>January 2020</td>
</tr>
<tr>
<td>Construction of Extreme Sports Centre</td>
<td>2019</td>
<td>2020</td>
</tr>
<tr>
<td>Construction of Southern Residential and plinth</td>
<td>2019</td>
<td>2021</td>
</tr>
<tr>
<td>Operation of Southern Residential</td>
<td>2022</td>
<td></td>
</tr>
</tbody>
</table>
5.4 Construction of the Project

i) Anticipated Building Construction

Stadium and Podium

5.4.1 It is anticipated that the Stadium (both Phase 1 and 2) will have a 41 month construction period.

5.4.2 The Stadium is generally reinforced concrete from basement level to level 6, with floors being of post-tensioned concrete. The north podium is also concrete along with the east and west sides of the south podium. The central portion of the south podium, entire south stand and floor levels above 6 are also of steel construction. The outer walls of the stairs and lift cores will be reinforced concrete.

5.4.3 The Stadium will be built in two main phases. The north, east and west can be constructed whilst the current Stadium is in use. The current Stadium must then be partially demolished to allow completion of the new Stadium.

5.4.4 The roof is a cablenet supporting steel rafters. The roof can be partially laid out in the first phase but cannot be lifted until the completion of the compression ring in the second phase.

5.4.5 The completion of each phase of the superstructure construction will be followed by internal fit out.

Tottenham Experience

5.4.6 The Tottenham Experience is envisaged as a mix of steel and concrete framed buildings. The Tottenham Experience will sit under the Stadium podium fronted by two, two storey pavilions. One of these pavilions wrap around the Grade 2 listed Warmington house, and will require sensitive construction with the interfaces.

Community Health Building

5.4.7 The Community Health Centre is envisaged as a mix of steel and concrete framed structure to create a building that sits over the top of the Stadium service yard. The two-storey building sits above the service yard and is enclosed with a mixture of solid panels and glazing, with an outer framework of vertical louvre blades that extend to ground to screen the service yard and also extend up and over the rooftop plant.

Hotel

5.4.8 The hotel will be a concrete framed tower fronting onto the corner of High Street and Park Lane.

Residential and Sports Centre

5.4.9 The residential towers and sports centre are being applied for in outline. As such, the detailed construction method is not yet known.

ii) Piling

5.4.10 Piling works shall be undertaken to ensure sufficient load-carrying capacity for the new Stadium. It is expected that CFA piling techniques will be employed within the Stadium, with a view to reducing noise and vibration levels, as compared to other piling techniques.

5.4.11 It is anticipated that the Stadium will require piles ranging from 0.6m to 0.9m and will be at an approximate depth of 25m below installations level.
iii) Construction Aggregate and Concrete Quantities

Aggregate

5.4.12 It is expected that 120,000m$^3$ of aggregate will be excavated from the site. It is estimated that 80,000m$^3$ (60%) of this aggregate will be reused for the construction of the Stadium. As there is the option for the Construction Compound at White Hart Lane Depot to be utilised during construction, there are two scenarios for how this aggregate will be handled.

5.4.13 In both scenarios, a temporary concrete batching plant will be set up onsite to produce concrete for the foundations and piles of the Stadium. This is only a temporary facility due to space restrictions onsite. This phase of the construction will require 20,000m$^3$ of aggregated which will be used for concrete batching onsite.

5.4.14 If the Construction Compound option is not taken forward, then:

- 20,000m$^3$ will be used on the Stadium site for batching concrete before batching plant is removed from site;
- 60,000m$^3$ will be taken to an alternative concrete batching plant site (taken to the batching plant site before the temporary batching plant is removed from site); and
- 40,000m$^3$ unwanted taken elsewhere.

5.4.15 If the Construction Compound option is taken forward, then:

- 20,000m$^3$ will be used on the Stadium site for batching concrete before batching plant is moved to the Construction Compound site;
- 60,000m$^3$ taken to Construction Compound for concrete batching (taken to the Construction Compound before batching plant is removed from site); and
- 40,000m$^3$ unwanted taken elsewhere.

5.4.16 Due to the outline nature of Phase 3, the level of detail is not yet available to accurately estimate the volumes of aggregate for this Phase. However, the number of construction vehicle trips has been estimated in Section 5.4.29 of this report.

Concrete

5.4.17 It has been estimated that approximately 65,000m$^3$ of concrete will be required for the construction of the Stadium. A total of 17,000m$^3$ is expected to be batched onsite using the temporary concrete batching facility. This concrete will be used for the foundations and piles for the Stadium.

5.4.18 After the onsite concrete batching facility has been removed from the site, it is expected that a further 48,000m$^3$ of concrete will be required. As there are two scenarios (with and without the Construction Compound), the concrete will either arrive from the Construction Compound, or from another batching facility.

5.4.19 Due to the outline nature of Phase 3, the level of detail is not yet available to accurately estimate the volumes of concrete required for this Phase. However, the number of construction vehicle trips has been estimated in Section 5.4.29 of this report.
iv) **Construction Traffic**

**Source of Traffic**

5.4.20 Construction traffic movements considers the following sources of traffic:

- Workforce movements to and from Construction Compound / Stadium site;
- Deliveries made to Construction Compound / Stadium site;
- Removal / import of material from Construction Compound / Stadium site; and
- Trips made by associated trades.

**Temporary Road Closures**

5.4.21 It is not currently anticipated that there would need to be any temporary road closures within the local area surrounding the Project Site as a result of the construction works. However, this will be reviewed with the Stadium contractor in planning the works, to ensure that environmental impact from any required temporary road closures (e.g. for deliveries of abnormal loads) are kept to a minimum.

**Construction Traffic Access/Route**

5.4.22 Specific access points into the Project Site will change during each construction Phase (Phases 1, 2 and 3), details of which have not yet been finalised.

5.4.23 **Phase 1 and 2:** Without the Construction Compound, all the Stadium construction traffic for Phases 1 and 2 would route to the construction site by way of the A1010 High Road/Fore Street that connects to site to the A406 North Circular Road. This would still be the route for the Stadium construction traffic if the Construction Compound option is taken forward other than the concrete deliveries and the majority of the aggregate exports.

5.4.24 **Phase 3:** It is assumed that the Construction Compound would become non-operational in late 2017. The facility would not be available for the final stage of construction related to Phase 3, and therefore, all the construction traffic for this phase would route to the construction site by way of the A1010 High Road/Fore Street that connects to site to the A406 North Circular Road.

**Peak Construction Traffic Volumes**

5.4.25 Set out below are the estimated daily peak construction traffic volumes during each phase. There are two scenarios for calculating the peak trip generation with regard to the construction of the Stadium, which considers the Project with and without the Construction Compound.

5.4.26 It is assumed that the Construction Compound would become non-operational for concrete batching in late 2017. The facility would not be available for the construction of Phase 3.

5.4.27 **Phase 1 (Northern Stadium) and Phase 2 (Southern Stadium) – Without the Construction Compound:** The peak trip generation for the Stadium construction will occur in May and June 2017 – at 75 1-way trips a day – i.e. a peak of 37 vehicles arrivals and departures. Further details are set out in the Transport Assessment submitted with this application.
5.4.28 **Phase 1 (Northern Stadium) and Phase 2 (Southern Stadium) – With the Construction Compound:**
The use of the work site would not significantly reduce the peak daily forecast, at 73 trips compared to 75, because that trip generation would still relate to the stadium demolition. However, benefits would be derived from the possibility of increasing bulk loads from $6m^3$ to $8.5m^3$ which offers a significant opportunity to reduce the number of trips. Additionally, the number of kilometres travelled by HGV transporting concrete to the site would be reduced by 194,341 km (96.5%). Further details are set out in the Transport Assessment submitted with this application.

5.4.29 **Phase 3 (Mixed Use):** The peak monthly construction traffic would occur in the second half of 2019 and October/November 2020. On each occasion the peak activity would equate to 13 1-way trips a day, 6-7 arrivals and departures. Further details are set out in the Transport Assessment submitted with this application.

i) **Site Set up**

5.4.30 A number of facilities and laydown areas will be required during the construction process of the Project. Onsite facilities will include:

- Office and Welfare facilities;
- Locker room;
- W/C’s;
- Canteen and Kitchen;
- Reception;
- Site operative area;
- Material Storage;
- Lay-down areas;
- Concrete pilling;
- Dewatering plant;
- Concrete batching plant; and
- Mobile aggregate washing plant.

5.4.31 The location of these facilities will be carefully considered to ensure that they are located in suitable locations to avoid any possible disruptions to the surrounding areas.

ii) **Hoarding / Fencing**

5.4.32 The Stadium contractor will provide site security measures around the site, through the provision of hoarding/fencing. Details of the types and height of hoarding/fencing have yet to be developed, however it will be confirmed with the Stadium contractor prior commencement, to ensure minimal environmental impact in providing the required control measures to mitigate anticipated security risks.

i) **Hours and Method of Working**

5.4.33 For this assessment, it has been assumed that the working hours will be **12 hours a day, 7 days a week**. These working hours have been used to inform the above construction and phasing programme.

5.4.34 However, this ES will also assess the Project against the Council’s standard working hours; The Council’s standard construction hours are Monday to Friday 08:00 – 18:00 and Saturday 08:00 – 13:00. For
assessment purposes, if the construction of the Project were to be restricted to the standard construction hours, the construction process would be extended by an additional year. Both scenarios will be assessed within this ES.

5.4.35 In order to maintain the Council’s standard working hours, the contractor(s) may require a period of up to half an hour before and up to one hour after normal working hours for start up and close down of activities.

5.4.36 The above working hours do not include operation of plant or machinery giving rise to noise with the potential to disturb nearby residents or the arrival of any HGV at site before 07:30 hrs.

5.4.37 There will be 100% on site crushing of demolished brickwork and concrete. While it is not possible to identify at this time the precise location of these activities on site they would be located and shielded so as to minimise noise levels at surrounding properties. The crushing activities would be subject to quick dust suppression through the use of water sprays. By crushing material on site it is available to be used as bulk fill as required and also to minimise the number of lorry movements required to remove excess material from the site.

5.5 Plant and Equipment

5.5.1 Consideration has been given to the types of plant and equipment that are likely to be used during the construction works. An indication of the typical types of plant and equipment associated with each key element of the works are set out below:

- Light tools and power tools;
- Excavators and hydraulic breakers;
- Bored piling rigs (CFA pilling);
- Mobile and Tower cranes;
- Hydraulic jacks (quiet pieces of equipment);
- Delivery vehicles;
- Small dump trucks;
- Dewatering plant;
- Concrete placing equipment; and
- Mobile aggregate washing plant.

5.6 Construction Environmental Management Plan

5.6.1 Details of measures to protect the environment during the construction of the Project will be set out in a Construction Environmental Management Plan (CEMP). Such measures will address hours of working, noise, vibration, dust, light spill, wheel washing and control of run-off. It is anticipated that the implementation of the CEMP will be a condition on the planning permission and it will be regularly monitored.

5.6.2 The CEMP would be held on-site and could be viewed by all interested parties with contact names, details, lines of communication, and mitigation action plans. All site personnel would be made aware of its existence and undertake to adhere to the guidance.

5.6.3 The main contractor would be required to nominate a representative to act as a contact point with the
Council, to ensure that any construction issues that may arise are dealt with effectively and promptly. Sub-contractors would also nominate or appoint a suitable team member responsible for liaison with the lead contractor’s representative and to ensure that sub-contractor construction activities are managed effectively.

5.6.4 The CEMP will be based on but not limited to the following documents as a minimum:

- Provisions in the Landfill Directive and associated legislative guidance
- Pollution Prevention Guideline (PPG) Notes – Environment Agency

5.6.5 Throughout the ES measures are set out to mitigate the effects of the Project during construction. These would be collated in, and implemented by, the CEMP where appropriate.

5.7 Construction Site Waste Management Plan

5.7.1 Tottenham Athletic Football Club Limited are committed to a strategic approach to managing materials and construction materials and ensuring the impact on the environment is minimised by reducing amount sent to landfill. Therefore, construction waste will be minimised wherever possible through best practice, and the site will be subject to a statutory Site Waste Management Plan.

5.7.2 All contractors will be required to develop and implement a Site Waste Management Plan. For all construction work, an assessment of the recycled content (by value) will be undertaken using WRAP’s Recycled-content toolkit. For all demolition work, at least 70% of materials arising will be reclaimed or recycled rather than sent to landfill. It is expected that for all construction work a recycled content of at least 10% (by value) will be achieved.

5.7.3 Given the size of the site, there will be sufficient space available for handling and storing waste. This will allow different waste streams to be separated (into, for example, untreated wood, treated wood, metals, plastics, inert wastes, plasterboard, hazardous wastes etc), thereby allowing them to be collected by waste management contractors who specialise in those specific waste streams. There is extensive guidance on good site management practice which makes it unlikely that impacts from construction waste will be significant.
6. **Air Quality**

6.1 **Introduction**

6.1.1 This chapter addresses the potential air quality effects the Project may have on the Project site and surrounding area. The assessment includes a summary of the current conditions found within the area and identifies mitigation measures where appropriate for adverse air quality effects that may arise as part of the Project. The assessment has been carried out by Air Quality Consultants Ltd.

6.1.2 The Project Site lies within an Air Quality Management Area (AQMA) declared by Haringey Council for exceedences of the nitrogen dioxide and fine particulate matter (PM$_{10}$) objectives.

6.1.3 The Project will lead to an increase in traffic on the local roads, which may impact on air quality at existing residential properties.

6.1.4 An energy strategy has been prepared by Buro Happold and can be found at Appendix 4.2. The strategy acknowledges that the Council is committed to delivering a District Energy Centre (DEN). The Club is committed to working with the Council on the delivery of a DEN and all buildings will be designed to connect to this network when completed. However, as full details of the location and specification of the DEN are unknown at this stage it cannot be assessed in air quality terms. If the District wide solution has not come forward by the time the residential development is delivered, and appears unlikely to come forward in the foreseeable future, consideration will be given to the provision of a single site wide energy centre within this development, subject to detailed feasibility testing and remodelling of the air quality impacts. In the intermediate phase prior to delivery of the district-wide solution, the various components of the Project will have their own independent energy solutions (a range of boiler and energy plant). The emissions from which could impact upon air quality at existing residential properties. This has been the basis for the Air Quality assessment and, as such, the following components have been assessed:

- The stadium houses 5.6MW of boiler plant and 5000kVA of generator plant;
- Residential Tower C houses 4.4MW of boiler plant and 330kVA of generator plant; and
- The Hotel house 3.2MW of boiler plant and 0.69MW 330kVA of generator plant.

6.1.5 The new residential properties will also be subject to the impacts of road traffic emissions from the adjacent road network, as well as emissions from the boiler plant located to the north of the Project Site within the Sainsbury’s and the University Technical College (UTC) site and the boiler and generator plant associated with the Project.

6.1.6 The main air pollutants of concern related to traffic emissions are nitrogen dioxide and fine particulate matter (PM$_{10}$ and PM$_{2.5}$), whilst those from the boiler plant are nitrogen dioxide and for the proposed diesel generators the main air pollutants of concern are nitrogen dioxide, PM$_{10}$ and PM$_{2.5}$.

6.1.7 The air quality neutrality of the Project has also been assessed following the methodology provided in the Greater London Authority’s (GLA’s) Supplementary Planning Guidance (SPG) on Sustainable Design and Construction (GLA, 2014a).

6.1.8 The GLA has also released Supplementary Planning Guidance on the Control of Dust and Emissions...
from Construction and Demolition (GLA, 2014b). The SPG outlines a risk assessment approach for construction dust assessment and helps determine the mitigation measures that will need to be applied.

6.1.9 This report describes existing local air quality conditions (2014), and the predicted air quality in the future assuming that the Project does, or does not proceed. Two future years are presented (2018 and 2021) to reflect the phasing of the Project. The THFC Stadium is due to be operational in 2018, and the first year of occupation of the residential element will be 2021. The assessment of construction dust impacts focuses on the anticipated duration of the works and the assessment of construction traffic focuses on the year of 2016 when most construction vehicles will be accessing the site.

6.1.10 The assessment of construction impacts is based on materials being transported to and from the Project Site from the A10 via the M25, without a local construction compound. However, a Construction Compound at White Hart Lane Depot has been proposed by the Club to support the construction phase of the Stadium (Phase 1 and 2) and a planning application is likely to be submitted for this imminently. This compound has been considered within this chapter and in Appendix 6.12.

6.1.11 This report has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology discussed with Haringey Council.

6.2 Assessment Criteria and Methodology

6.2.1 Legislative Context

Air Quality Strategy

6.2.2 The Air Quality Strategy published by the Department for Environment, Food, and Rural Affairs (Defra) provides the policy framework (Defra, 2007) for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Clean Air Act 1993

6.2.3 Small combustion plant of less than 20 MW net rated thermal input is controlled under the Clean Air Act 1993. This requires the local authority to approve the chimney height. Plant which are smaller than 366kW have no such requirement.

6.2.4 Measures to ensure adequate dispersion of emissions from discharging stacks and vents are included in Technical Guidance Note D1 (Dispersion) (HMSO, 1993b), issued in support of the Environmental Protection Act (HMSO, 1990).
National Planning Policy

6.2.5 The National Planning Policy Framework (NPPF) (2012) sets out planning policy for England in one place. It places a general presumption in favour of sustainable development, stressing the importance of local development plans, and states that the planning system should perform an environmental role to minimise pollution. One of the twelve core planning principles notes that planning should “contribute to…reducing pollution”. To prevent unacceptable risks from air pollution, planning decisions should ensure that new development is appropriate for its location. The NPPF states that the effects of pollution on health and the sensitivity of the area and the development should be taken into account.

6.2.6 More specifically the NPPF makes clear that: “Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan”.

6.2.7 The NPPF is now supported by Planning Practice Guidance (PPG) (DCLG, 2014), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that “Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values” and “It is important that the potential impact of new development on air quality is taken into account … where the national assessment indicates that relevant limits have been exceeded or are near the limit”. The role of the local authorities is covered by the LAQM regime, with the PPG stating that local authority Air Quality Action Plans “identify measures that will be introduced in pursuit of the objectives”.

6.2.8 The PPG states that “Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)”. 

6.2.9 The PPG sets out the information that may be required in an air quality assessment, making clear that “Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality”. It also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that “Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact”.

The London Plan

6.2.10 The London Plan (GLA, 2015) sets out the spatial development strategy for London consolidated with alterations made to the original plan since 2011. It brings together all relevant strategies, including those relating to air quality.

6.2.11 Policy 7.14, ‘Improving Air Quality’, addresses the spatial implications of the Mayor’s Air Quality Strategy and how development and land use can help achieve its objectives. It recognises that Boroughs should have policies in place to reduce pollutant concentrations, having regard to the Mayor’s Air Quality Strategy.
6.2.12 Policy 7.14B(c), requires that development proposals should be “at least ‘air quality neutral’ and not lead to further deterioration of existing poor air quality (such as designated Air Quality Management Areas (AQMAs))”. Further details of the London Plan in relation to planning decisions are provided in Appendix 6.1.

The Mayor’s Air Quality Strategy

6.2.13 The revised Mayor’s Air Quality Strategy (MAQS) was published in December 2010 (GLA, 2010). The overarching aim of the Strategy is to reduce pollution concentrations in London to achieve compliance with the EU limit values as soon as possible. The Strategy commits to the continuation of measures identified in the 2002 MAQS, and sets out a series of additional measures. These additional measures and the role of the Low Emission Zone are described in Appendix 6.1.

6.2.14 The MAQS also addresses the issue of ‘air quality neutral’ and states that “GLA will work with boroughs to assist in the development of methodologies that will allow an accurate assessment of the impacts of the emissions of new developments” (Para 5.3.19).

GLA SPG: Sustainable Design and Construction

6.2.15 The GLA’s SPG on Sustainable Design and Construction (GLA, 2014a) provides details on delivering some of the priorities in the London Plan. Section 4.3 covers Air Pollution. It defines when developers will be required to submit an air quality assessment, explains how location and transport measures can minimise emissions to air, and provides emission standards for gas-fired boilers, Combined Heat and Power (CHP) and biomass plant. It also sets out, for the first time, guidance on how Policy 7.14B(c) of the London Plan relating to ‘air quality neutral’ (see Paragraph 6.2.12, above) should be implemented.

GLA SPG: The Control of Dust and Emissions During Construction and Demolition

6.2.16 The GLA’s SPG on The Control of Dust and Emissions During Construction and Demolition (GLA, 2014b) outlines a risk assessment based approach to considering the potential for dust generation from a construction site, and sets out what mitigation measures should be implemented to minimise the risk of construction dust impacts, dependent on the outcomes of the risk assessment. This guidance is largely based on the Institute of Air Quality Management’s (IAQM) 2014 guidance on the Assessment of dust from demolition and construction (Institute of Air Quality Management, 2014), and it states that “the latest version of the IAQM Guidance should be used”.

Local Transport Plan

6.2.17 The Haringey Local Implementation Plan (Haringey Council, 2011) sets out how the Mayor’s Transport Strategy will be delivered within Haringey up until 2031. Air quality is referred to as one of the main transport challenges. It is the objective of the Council to: ‘Improve air quality within the borough through initiatives to reduce and mitigate the effects of pollutant emissions from road and diesel operated rail transport.

6.2.18 The Council has set the challenge to improve air quality within the borough by reducing car use, it states that ‘Haringey Council will continue to introduce initiatives that reduce air pollutant emissions from road transport by promoting smarter travel choices, raising awareness and encouraging sustainable travel behaviour. These include promoting walking and cycling for short journeys, and increased use of public
transport. More sustainable car use will be encourage [sic] through car clubs, car sharing, and the use of fuel efficient vehicles, such as electric vehicles, and smarter driving techniques’.

Local Policies

6.2.19 Haringey’s Local Plan (Haringey Council, 2013) was formally adopted in March 2013 and sets out the strategic policies within the borough for the period 2013 to 2016. The Local Plan Strategic Policy 7 Transport relates to air quality in its section on “Delivering Action on Climate Change and Quality and Healthy Places” and states that it will work with its partners in the promotion of traffic management schemes such as:

- “Minimising congestion and addressing the environmental impacts of travel;
- Promoting public transport, walking and cycling…
- …Seeking to locate major trip generating developments in locations with good access to public transport and so better integrate transport and land use planning.
- Adopting maximum car parking standards and car free housing wherever feasible;…
- …Supporting measures to influence behavioural change such as promoting low carbon vehicles…”

6.2.20 A number of policies included within Haringey’s Unitary Development Plan (Haringey Council, 2013) have been saved as part of the new local plan. A number of the saved policies refer to air quality and include:

“Policy UD1 Planning Statements:

Where appropriate, all development proposals (except ‘householder development’) are to be accompanied by one or more of the following:

i) air quality statement, for significant impact on air quality…

Policy UD3 General Principles:

“The Council will require development proposals to demonstrate that:

a) there is no significant adverse impact on residential amenity or other surrounding uses in terms of loss of daylight or sunlight, privacy, overlooking, aspect and the avoidance of air, water, light and noise, pollution (including from the contamination of groundwater/water courses or from construction noise) and of fume and smell nuisance; …”

Policy ENV7 Air, Water and Light Pollution:

The Council will control potential pollution resulting from development in the Borough by:

b) requiring developments to include measures to avoid, reduce and only then mitigate the emissions of pollutants, where appropriate; …”

6.2.21 Much of the detail to support the UDP policies is contained within accompanying Supplementary Planning Documents (SPDs), which are a material consideration for development control purposes. The Council
adopted the Sustainable Design & Construction SPD in March 2013 (Haringey Council, 2013), Section 7 is on pollution and sets out the requirements for an air quality assessment and states that “Any mitigation measures should be incorporated into the design prior to submission”.

**Air Quality Action Plan**

6.2.22 Haringey Council has declared an AQMA for nitrogen dioxide and PM\textsubscript{10} that covers the whole Borough. The Council has since developed an Air Quality Action Plan (Haringey Council, 2011). The main objectives of the Action Plan are to:

- “demonstrate the Council’s commitment to improving air quality and lead by example
- provide an overview of local key policies with respect to air quality
- improve air quality whilst maintaining economic stability and to explore wider economic opportunities
- involve all relevant Council departments and external agencies where appropriate, to ensure a balances and integrated approach in Haringey
- improve the quality of life and health of the residents and workforce of Haringey”.

6.2.23 **Assessment Criteria**

*Construction Dust Criteria*

6.2.24 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management\textsuperscript{1} (IAQM) (2014), on which the assessment methodology outlined in the GLA’s SPG (GLA, 2014b) is based, has been used. Full details of this approach are provided in Appendix 6.2.

*Health Criteria*

6.2.25 The Government has established a set of air quality standards and objectives to protect human health. The ‘standards’ are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The ‘objectives’ set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations, 2000, Statutory Instrument 928(2000) and the Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043(2002).

6.2.26 The objectives for nitrogen dioxide and PM\textsubscript{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The PM\textsubscript{2.5} objective is to be achieved by 2020.

6.2.27 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance(Defra, 2009). The annual mean objectives for nitrogen dioxide and PM\textsubscript{10} are considered to apply at the façades of residential properties, schools,

\textsuperscript{1} The IAQM is the professional body for air quality practitioners in the UK.
hospitals etc.; they do not apply at hotels. The 24-hour objective for PM$_{10}$ is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

6.2.28 The European Union has also set limit values for nitrogen dioxide, PM$_{10}$ and PM$_{2.5}$. The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one (Directive 2008/50/EC of the European Parliament and of the Council, 2008). In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded.

6.2.29 The relevant air quality criteria for this assessment are provided in Table 6.1.

### Table 6.1: Air Quality Criteria for Nitrogen Dioxide, PM$_{10}$ and PM$_{2.5}$

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Time Period</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen Dioxide</td>
<td>1-hour Mean</td>
<td>200 µg/m$^3$ not to be exceeded more than 18 times a year</td>
</tr>
<tr>
<td></td>
<td>Annual Mean</td>
<td>40 µg/m$^3$</td>
</tr>
<tr>
<td>Fine Particles (PM$_{10}$)</td>
<td>24-hour Mean</td>
<td>50 µg/m$^3$ not to be exceeded more than 35 times a year</td>
</tr>
<tr>
<td></td>
<td>Annual Mean</td>
<td>40 µg/m$^3$</td>
</tr>
<tr>
<td>Fine Particles (PM$_{2.5}$)</td>
<td>Annual Mean</td>
<td>25 µg/m$^3$</td>
</tr>
</tbody>
</table>

a) The PM$_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.
b) A proxy value of 32 µg/m$^3$ as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM$_{10}$ objective being exceeded. Measurements have shown that, above this concentration, exceedences of the 24-hour mean PM$_{10}$ objective are possible (Defra, 2009).

6.2.30 **Descriptors for Air Quality Impacts and Assessment of Significance**

### Construction Dust Significance

6.2.31 Guidance from the IAQM (Institute of Air Quality Management, 2014) is that, with appropriate mitigation in place, the effects of construction dust will be ‘not significant’. The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that impacts will normally be ‘not significant’.

### Construction Traffic and Operational Significance

6.2.32 There is no official guidance in the UK on how to describe air quality impacts, nor how to assess their significance. The approach developed jointly by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)$^2$ (EPUK & IAQM, 2015) has therefore been used. This includes defining descriptors of the impacts at individual receptors, which take account of the percentage change in concentrations relative to the relevant air quality objective, rounded to the nearest whole number, and the absolute concentration relative to the objective. The overall significance of the air quality effects is

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$^2$ The IAQM is the professional body for air quality practitioners in the UK.
determined using professional judgement, taking account of the impact descriptors. Full details of the EPUK/IAQM approach are provided in Appendix 6.3. The approach includes elements of professional judgement, and the experience of the consultants preparing the report is set out in Appendix 6.4.

6.2.33 It is important to differentiate between the terms impact and effect with respect to the assessment of air quality. The term impact is used to describe a change in pollutant concentration at a specific location. The term effect is used to describe an environmental response resulting from an impact, or series of impacts. Within this chapter, the air quality assessment has used published guidance and criteria described in the following sections to determine the likely air quality impacts at a number of sensitive locations. The potential significance of effects has then been determined by professional judgement, based on the frequency, duration and magnitude of predicted impacts and their relationship to appropriate air quality objectives.

6.2.34 Geographical Scope

6.2.35 The study area addressed for construction impacts extends to 350 m from the Project Site construction works, and for construction trackout for a distance of 500 m from the construction site exit. Construction traffic and operational traffic impacts extend along the local road network for distances dependent on whether significant changes in traffic are expected. The area extends approximately 1 km in each direction from the Project Site. This area is also considered appropriate for the assessment of potential impacts from the energy plant emissions.

6.2.36 Assessment Approach

Consultation

6.2.37 The assessment follows a methodology discussed with Haringey Council via telephone and email correspondence between Alison Bell (Environmental Health Officer at Haringey Council) and Kieran Laxen (Air Quality Consultants) held in July 2015. Specific requests were made to include modelling of the car park emissions and also assessment a worst-case scenario of the entire development operating at 100% capacity.

Existing Conditions

6.2.38 Existing sources of emissions within the study area have been defined using a number of approaches. A site visit was carried out as part of the previous assessment to identify existing sources from a visual inspection of the area. A further site visit has been carried out as part of the current assessment, to confirm local conditions. Industrial and waste management sources that may affect the area have been identified using the European Pollutant Release and Transfer Register (European Environment Agency, 2014) and the Environment Agency’s website ‘what’s in your backyard’ (Environment Agency, 2015). Local sources have also been identified through discussion with Haringey Council’s, Environmental Health Department as well as through examination of the Council’s Air Quality Review and Assessment reports.

6.2.39 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. The monitoring covers an area greater than the study area for this assessment and is used to provide context for the assessment. The background concentrations across the study area have been defined using the national pollution maps published by Defra (2015a). These cover the whole
country on a 1x1 km grid. Current exceedences of the annual mean EU limit value for nitrogen dioxide have been identified using the maps of roadside concentrations published by Defra (2015e). These are the maps, currently based on 2012 data, used by the UK Government, together with the results from national AURN monitoring sites that operate to EU data quality standards, to report exceedences of the limit value to the EU.

**Construction Dust Impacts**

6.2.40 The construction dust assessment considers the potential for impacts within 350 m of the site boundary; or within 50 m of roads used by construction vehicles out to a distance of up to 500 m from the site exit. The assessment methodology follows the GLA’s SPG on the Control of Dust and Emissions During Construction and Demolition (GLA, 2014b), which is based on that provided by the IAQM (Institute of Air Quality Management, 2014). This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix 6.2 explains the approach in more detail.

6.2.41 It should be noted that the construction phasing set out in Chapter 5 assumes a 12-hour working day, 7 days a week. An alternative construction solution would for standard construction hours and therefore the overall construction period will be extended by 1 year (i.e. 2022). The construction impacts of the shorter working hours will be broadly the same but would occur for less time per day but for a longer period. It is considered that the assessment is appropriate for both construction scenarios.

**Construction Traffic Impacts**

6.2.42 Predictions of nitrogen dioxide, PM$_{10}$ and PM$_{2.5}$ concentrations have been carried out for a base year (2014), and the future year of 2016, when the number of vehicles used in the construction phase will be greatest. This assessment follows the same methodology as the operational road traffic assessment; pollutant concentrations have been predicted at a number of receptor locations including likely worst-case locations using the ADMS-Roads dispersion model. Further details of the assessment methodology are explained below in paragraphs 6.2.43 to 6.2.52. The scenario assessed within the chapter assumes no construction compound.

**Operational Road Traffic Impacts**

**Sensitive Locations**

6.2.43 Concentrations of nitrogen dioxide, PM$_{10}$ and PM$_{2.5}$ have been predicted at a number of locations with relevant exposure adjacent to roads near to the Project Site and within the Project Site. Receptors have been identified to represent worst-case exposure within these locations. When selecting these receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links. In general the receptors have been located on the façades of the properties closest to the sources.

6.2.44 A total of 100 existing residential properties have been identified as receptors for the assessment. An
additional 32 receptor locations have been identified within the Project Site, which represent exposure to the combination of the existing sources and the new sources from the Project. The receptors have been modelled at a range of heights because some of the ground-level receptors are not classified as relevant exposure for the objectives, e.g. local shops. Receptors 1-93 have been modelled at the following heights: 1.5 m, 4.5 m, 7.5 m and 10.5 m. Receptor UTC is modelled at 12 m and represents a roof terrace. Receptors TA to TE2 represent nearby residential tower blocks and have been modelled from ground floor (1.5 m) to the top of the building (37.5 m), at 6 m increments. The on-site receptors have been modelled at a range of heights to represent typical exposure. A receptor was modelled in the middle of the pitch to assess the impacts within the stadium. These locations are shown in Figure 6.1 and Figure 6.2 (shown in Appendix 6.5). In addition, concentrations have been modelled at the automatic monitoring site located at High Road, Haringey (HGY1), in order to verify the modelled results (see Appendix 6.6 for verification method).

**Assessment Scenarios**

6.2.45 Predictions of nitrogen dioxide, PM$_{10}$ and PM$_{2.5}$ concentrations have been carried out for a base year (2014), and two future years, 2018 when the stadium is expected to be operational and 2021 when the whole site is expected to be fully operational. For both 2018 and 2021, predictions have been made assuming both that the Project does proceed (With Scheme), and does not proceed (Without Scheme). A further 2018 and 2021 sensitivity test has been carried out for nitrogen dioxide that involves assuming no reduction in emission factors for road traffic from the baseline year. This is to address the issue identified by Defra (Carslaw, Beevers, Westmoreland, & Williams, 2011) that road traffic emissions have not been declining as expected which is reflected in the absence of any downward trend of the monitoring data at the local monitoring site at Haringey Town Hall (see later section on Local Air Quality Monitoring and the section on Uncertainty). Nitrogen dioxide concentrations in both 2018 and 2021, with and without the scheme, are thus presented for two scenarios: 'With Emissions Reduction' and 'Without Emissions Reduction'. The without emission reduction scenario is not expected to be a realistic representation of the impacts but will provide an extreme worst-case sensitivity test.

6.2.46 The 2021 ‘With Scheme’ scenario includes the proposed new car parks (see Appendix 6.6).

**Modelling Methodology**

6.2.47 Concentrations due to road traffic have been predicted using the ADMS-Roads dispersion model. Details of the model inputs and the model verification are provided in Appendix 6.6, together with the method used to derive current and future year background nitrogen dioxide concentrations. The dominating input variables are the emissions from the road traffic.

**Traffic Data**

6.2.48 Traffic data have been provided for all the scenarios. Baseline traffic data were derived from 24hr counts at 20 locations within the local area in 2015. These traffic counts were taken on a non-event day and therefore do not include the contribution to the annual average daily flows of the event-day traffic. The one day traffic counts were adjusted to represent annual average daily traffic (AADT) flows using DfT adjustment factors for typical urban areas, taking account of the time of year the counts were carried out. An uplift factor was calculated, based on the number of event-day related trips adjusted to an AADT equivalent, and applied to the baseline 2015 traffic flows. The resultant baseline traffic data set
represents AADT flows including the stadium related traffic.

6.2.49 Traffic flows on local roads have been shown to be constant over recent years, and if anything reducing. Therefore as a worst-case this 2015 baseline traffic dataset has been taken to represent both 2014 and future year baseline traffic data.

6.2.50 The 2018 “with Project” traffic datasets include the traffic generated by the aspects of the Project operational in 2018 and also a contribution to the annual average daily traffic flow of the additional event-day traffic.

6.2.51 The 2021 “with Project” traffic datasets include the traffic generated by the entire Project and also a contribution to the annual average daily flow of the event-day traffic.

6.2.52 The additional event-day traffic is based on an assumed number of events: 26 THFC matches, 10 Major Sporting Events (at least 2 of which will be NFL games) and 6 concerts.

**Impacts of the Proposed Boiler and Generator Plant**

**Sensitive Locations**

6.2.53 In terms of the potential impacts from the proposed gas boiler plant and diesel generators, concentrations have been modelled at the same 132 receptors both within and close to the Project Site at a range of heights.

**Assessment Scenarios**

6.2.54 Predictions of nitrogen dioxide and PM concentrations have been carried out assuming that the plant is installed in 2021.

**Modelling Methodology**

6.2.55 The impacts of emissions from the proposed gas boiler plant and diesel generators have been modelled using the ADMS-5 dispersion model. ADMS-5 incorporates a state-of-the-art understanding of the dispersion processes within the atmospheric boundary layer. Entrainment of the plume into the wake of the building has been simulated within the model. The model outputs are dependent on the meteorological data used. In order to confirm a worst-case meteorological dataset is being used, an initial sensitivity test was carried out whereby concentrations were predicted for four meteorological years to determine which year resulted in the highest concentrations. This meteorological dataset associated with the highest concentrations was then used to model the potential impacts of the proposed gas boilers and diesel generators on the existing and future receptors. Other than the meteorological data the dominating input variables within the model are the emissions from the point sources (the boilers and generators).

6.2.56 The methodology is presented in further detail in Appendix 6.6, as are the model input parameters.

**Boiler and Generator Plant**

6.2.57 The Project includes a range of boiler and generator plant:
The stadium houses 5.6MW of boiler plant and 5000kVA of generator plant.

Residential Tower C houses 4.4MW of boiler plant and 330kVA of generator plant.

The Hotel house 3.2MW of boiler plant and 0.69MW of generator plant.

The Extreme Sport Building houses 0.56MW of boiler plant.

The boiler plant will operate on natural gas, while the generator plant will operate on diesel oil. The generator plant are assumed to operate for limited periods. The details of the operating hours are presented in Appendix 6.6. Operating the plant for periods significantly greater than has been assumed may result in the modelling being invalid.

6.2.59 The boiler plant and generators are only considered to be operational in the 2021 “with Project” ‘Air Quality Neutral’

6.2.60 The guidance relating to air quality neutral follows a tiered approach, such that all developments are expected to comply with minimum standards for gas boilers, combined heat and power (CHP) and biomass plant (GLA, 2014a). Compliance with ‘air quality neutral’ is then founded on emissions benchmarks that have been derived for both building (energy) use and road transport in different areas of London. Developments that exceed the benchmarks are required to implement on-site or off-site mitigation to offset the excess emissions (GLA, 2014a).

6.2.61 Appendix 6.7 of this report sets out the emissions benchmarks. The approach has been to calculate the emissions from the Project and to compare them with these benchmarks.

Assumptions and Limitations

6.2.62 The air quality modelling has been carried out based on a range of assumptions of operational use of the boiler and generator plant, the traffic flows and other variables. Where possible a realistic worst-case approach has been adopted.

6.2.63 The 2018 scenario only covers an assessment of road traffic impacts; it does not include the stadium related boiler and generator plant would be operational in 2018. The stadium related boiler and generator plant are included in the assessment of the full development in 2021, along with the boiler and generator plant for the hotel and residential units.

Uncertainty in Modelling Predictions

6.2.64 There are many components that contribute to the uncertainty of modelling predictions. The road model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them. The point source model used in the assessment is dependent upon emission rates, flow rates temperatures of the exhaust and other parameters from the point sources all of which are variable during use. There are then additional uncertainties, as the model is required to simplify real-world conditions into a series of algorithms. An important stage in the process is model verification, which involves comparing the model output with measured concentrations (see Appendix 6.6). This can

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3 Rated based on Net Thermal Input (net fuel in based on natural gas).
4 This provides power for the Tottenham Experience and the NE building as well as the stadium.
5 The kVA is the output.
only be done for the road traffic model. The level of confidence in the verification process is necessarily enhanced when data from an automatic analyser have been used, as has been the case for this assessment (see Appendix 6.6). Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of current year (2014) concentrations.

6.2.65 For point sources, the emissions are assumed to be constant regardless of the year. However, predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations, and vehicle emissions. A disparity between the road transport emission projections and measured annual mean concentrations of nitrogen oxides and nitrogen dioxide has been identified by Defra (Carslaw, Beevers, Westmoreland, & Williams, 2011). This is evident across the UK, although the effect appears to be greatest in inner London; there is also considerable inter-site variation. Whilst the emission projections suggested that both annual mean nitrogen oxides and nitrogen dioxide concentrations should have fallen by around 15-25% over the 6 to 8 years prior to 2009, at many monitoring sites levels remained relatively stable, or even showed a slight increase. This pattern is mirrored in the monitoring data assembled for this study, as set out in Paragraph 6.3.7.

6.2.66 The reason for the disparity between the expected concentrations and those measured relates to the on-road performance of modern diesel vehicles. New vehicles registered in the UK have to meet progressively tighter European type approval emissions categories, referred to as “Euro” standards. While the nitrogen oxides emissions from newer vehicles should be lower than those from equivalent older vehicles, the on-road performance of some modern diesel vehicles is often no better than that of earlier models. This has been compounded by an increasing proportion of nitrogen dioxide in the nitrogen oxides emissions, i.e. primary nitrogen dioxide, which has a significant effect on roadside concentrations (Carslaw, Beevers, Westmoreland, & Williams, 2011).

6.2.67 Defra has taken account of the historical discrepancies in its latest emissions factors which it published in 2014. These show only limited reductions prior to 2014, but continue to show some large improvements thereafter. This is principally because, where previous standards had limited on-road success, the best current evidence is that the ‘Euro VI’ and ‘Euro 6’ standards that new vehicles had to comply with from 2013/15⁶ will deliver real improvements, as, for the first time, they will be compliant with the World Harmonized Test Cycle, which better represents real-world driving conditions⁷ and includes a separate slow-speed cycle for heavy duty vehicles. There is, nevertheless, limited information on whether the full improvements expected are being, and will be, delivered, so there remains some uncertainty as to whether emissions will reduce at the rates set out in Defra’s Emission Factors Toolkit (Defra, 2015b).

6.2.68 To account for the uncertainty about future vehicle emissions of nitrogen oxides and nitrogen dioxide, a sensitivity test has been conducted assuming that the future (2018 and 2021) road traffic emissions per vehicle are unchanged from 2014 values (without emissions reduction). The predictions within this sensitivity test will almost certainly be over-pessimistic, as new Euro VI and Euro 6 vehicles will make up roughly 55% of HDVs and 42% of LDVs on the road in 2018, according to Defra’s Emission Factors

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⁶ Euro VI refers to heavy duty vehicles, while Euro 6 refers to light duty vehicles. The timings for meeting the standards vary with vehicle type and whether the vehicle is a new model or existing model.

⁷ The test cycle for real-world emissions for Euro 6 vehicles will not be implemented until about 2017. However, there is still expected to be a substantial improvement in NOx emissions from Euro 6 vehicles (as compared with Euro 5) from 2015 onwards.
Toolkit. This will have increased to roughly a 76% and 65% penetration of Euro VI and Euro 6 vehicles respectively in 2021. Future concentrations due to road traffic emissions will therefore be below the ‘without emissions reduction’ values, but may be above Defra’s ‘with emissions reduction’ values, i.e. they will lie between the two sets of values, but are likely to be closer to the official Defra values than those in the sensitivity test.

6.2.69 In addition, the dispersion modelling has assumed that certain roads surrounding the Project Site have been considered to behave like a street canyon, meaning that the model assumes that only limited dispersion occurs within these areas. The roads that have been assumed to be street canyons are shown in Figure A6.6.2 in Appendix 6.6. In reality, dispersion does occur within street canyons, particularly those which are wide and shallow, with uneven or broken facades on one or both sides. The consequence of this is that modelled nitrogen dioxide concentrations at receptor façades are likely to be higher than will occur in practice.

6.3 Baseline Conditions

6.3.1 The Project Site is located in Tottenham in the northeast of the London Borough of Haringey. The site is bounded by High Road to the west, Worcester Avenue to the east and Park Lane to the south. It currently consists of the existing THFC ‘stadium’ and associated infrastructure. There are existing residential and commercial buildings to the east, south and west and a Sainsbury’s supermarket to the north.

Industrial sources

6.3.2 A search of the European Pollutant Release and Transfer Register (European Environment Agency, 2014) and Environment Agency’s ‘what’s in your backyard’ (Environment Agency, 2015) websites did not identify any significant industrial or waste management sources that are likely to affect the Project, in terms of air quality.

Site Visit

6.3.3 The first site visit was carried out in 2013, with a further site visit carried out on 6th August 2015. Other than road traffic, no significant sources of air pollution were identified during the site visits.

Air Quality Review and Assessment

6.3.4 Haringey Council has investigated air quality within its area as part of its responsibilities under the LAQM regime. In July 2001 an AQMA was declared across the whole borough for exceedences of the nitrogen dioxide and PM$_{10}$ objectives.

Local Air Quality Monitoring

6.3.5 Haringey Council operates two automatic monitoring stations within its area. The Haringey High Road roadside automatic monitoring site is located approximately 300 m southwest of the Project Site. The Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Lambeth Scientific Services (using the 50% TEA in acetone method). In 2014 diffusion tube monitoring was completed at four sites within approximately 1.5 km of the Project Site (HR07 closed in September 2014). Results for the years 2009 to 2014 are summarised in Table 6.2 and the monitoring locations are shown in Figure 6.3 (shown in Appendix 6.5).
Table 6.2: Summary of Nitrogen Dioxide (NO2) Monitoring (2009-2014) a,b

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Site Type</th>
<th>Location</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGY1</td>
<td>Roadside</td>
<td>High Road</td>
<td>42</td>
<td>45</td>
<td>38</td>
<td>42</td>
<td>43</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HGY1</td>
<td>Roadside</td>
<td>High Road</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR07</td>
<td>Urban Background</td>
<td>Park View Road</td>
<td>34</td>
<td>38</td>
<td>33</td>
<td>32</td>
<td>29</td>
<td>25</td>
</tr>
<tr>
<td>HR14</td>
<td>Roadside</td>
<td>High Road</td>
<td>48</td>
<td>47</td>
<td>44</td>
<td>46</td>
<td>39</td>
<td>37</td>
</tr>
<tr>
<td>HR23</td>
<td>Roadside</td>
<td>High Street</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>42</td>
<td>37</td>
<td>41</td>
</tr>
<tr>
<td>HR25</td>
<td>Roadside</td>
<td>White Hart Lane</td>
<td>-</td>
<td>-</td>
<td>36</td>
<td>37</td>
<td>34</td>
<td>34</td>
</tr>
</tbody>
</table>

- **Automatic Monitors – Annual Mean (µg/m³)**
  - **Objective**: 40

- **Automatic Monitors – No. of Hours > 200 µg/m³**
  - **Objective**: 18 (200 – 99.79th Percentile if low data capture)

a. Exceedences of the objectives are shown in bold.
b. 2009 and 2010 data have been taken from the 2010 Air Quality Progress Report (Haringey Council, 2011), 2011 to 2014 data have been taken from the Air Quality Updating and Screening Assessment for 2014 (Haringey Council, 2015).
c. Data capture was 64 % in 2014 and therefore results have been annualised in accordance with Box 3.2 in LAQM.TG(09) (Defra, 2009) (see Appendix 6.8).

6.3.6 Concentrations have exceeded or been close to exceeding the annual mean nitrogen dioxide objective at the roadside monitoring locations, these measured concentrations are considered to be representative of baseline conditions across the Project Site. At the urban background diffusion tube monitoring site annual mean concentrations are well below the annual mean objective.

6.3.7 Annual mean concentrations at the HR07 urban background site and the HR14 roadside site suggest an overall downward trend over the past six years. However, examining the data for the roadside automatic monitoring site, HGY1, which provides more accurate data, there is no significant trend in monitoring results over the last 10 years (Figure 6.4, shown in Appendix 6.5). This contrasts with the expected decline due to the progressive introduction of new vehicles operating to more stringent standards. The implications of this are discussed in Section 6.4 of this report.

6.3.8 The Haringey HGY1 automatic monitoring station, located on High Road measured PM_{10} concentrations from 2009 to 2013, PM_{10} monitoring ceased at this site in 2014. There are no other sites in Haringey which measure PM_{10}. Results for the years 2009 to 2013 are summarised in Table 6.3 information. PM_{2.5} concentrations are also measured at this automatic monitor. Data for 2009-2014 are also presented in Table 6.3. Measured concentrations of both PM_{10} and PM_{2.5} have consistently been well below the relevant objectives and have remained relatively stable.
Table 6.3: Summary of PM\textsubscript{10} and PM\textsubscript{2.5} Monitoring (2009-2014)

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Site Type</th>
<th>Location</th>
<th>2009</th>
<th>2010</th>
<th>2011 \textsuperscript{a}</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGY1</td>
<td>Roadside</td>
<td>High Road</td>
<td>21</td>
<td>23</td>
<td>-</td>
<td>23</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>Objective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HGY1</td>
<td>Roadside</td>
<td>High Road</td>
<td>5</td>
<td>9</td>
<td>-</td>
<td>11</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>Objective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35 (50 – 90\textsuperscript{th} percentile if low data capture)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM\textsubscript{10} Annual Mean (µg/m\textsuperscript{3})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM\textsubscript{2.5} Annual Mean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{a} In 2011 the data were affected by the Tottenham riots.
\textsuperscript{b} Reference equivalent. Data capture was 82% in 2014, and thus the results have been annualised in accordance with Box 3.2 in LAQM.TG(09) (Defra, 2009) (see Appendix 6.8).

Exceedences of EU Limit Value

6.3.9 There are several AURN monitoring sites within the Greater London Urban Area that have measured exceedences of the annual mean nitrogen dioxide limit value. Furthermore, the national map of roadside annual mean nitrogen dioxide concentrations (Defra, 2015e), used to report exceedences of the limit value to the EU, identifies exceedences of this limit value in 2012 along many roads in London, including the High Road adjacent to the Project Site. The Greater London Urban Area has thus been reported to the EU as exceeding the limit value for annual mean nitrogen dioxide concentrations. The national maps of roadside PM\textsubscript{10} and PM\textsubscript{2.5} concentrations show no exceedences of the limit values anywhere in London. These maps are for 2012 concentrations; detailed maps of predicted future year exceedences are not available (Defra, 2015e).

Background Concentrations

6.3.10 In addition to these locally measured concentrations, estimated background concentrations in the study area have been determined for 2014 and the future years of 2018 and 2021 (Table 6.4). In the case of nitrogen dioxide, two sets of future-year backgrounds are presented to take into account uncertainty in future year vehicle emission factors. The derivation of background concentrations is described in Appendix 6.6. The future year background concentrations are all well below the objectives.

Table 6.4: Estimated Annual Mean Background Pollutant Concentrations in 2014, 2018 and 2021

<table>
<thead>
<tr>
<th>Year</th>
<th>NO\textsubscript{2}</th>
<th>PM\textsubscript{10}</th>
<th>PM\textsubscript{2.5}</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014\textsuperscript{a}</td>
<td>27.1 – 30.4</td>
<td>21.1 – 22.3</td>
<td>14.6 – 15.2</td>
</tr>
<tr>
<td>2018 – Without Reductions in Traffic Emissions \textsuperscript{b}</td>
<td>25.5 – 28.8</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2018 – With Reductions in Traffic Emissions \textsuperscript{c}</td>
<td>23.4 – 26.0</td>
<td>20.2 – 21.4</td>
<td>13.8 – 14.4</td>
</tr>
<tr>
<td>2021 – Without Reductions in Traffic Emissions \textsuperscript{d}</td>
<td>24.7 – 28.0</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2021 – With Reductions in Traffic Emissions \textsuperscript{e}</td>
<td>20.9 – 23.0</td>
<td>19.8 – 21.0</td>
<td>13.4 - 14.0</td>
</tr>
</tbody>
</table>

| Objectives | 40 | 40 | 25 |

n/a = not applicable. The range of values is for the different 1x1 km grid squares that cover the study area.

\textsuperscript{a} This assumes that road vehicle emission factors in 2014 remain the same as in 2011 (See Appendix 6.6).
\textsuperscript{b} This assumes that road vehicle emission factors in 2018 remain the same as in 2011.
\textsuperscript{c} This assumes that road vehicle emission factors reduce between 2014 and 2018 at the current ‘official’ rates.
d. This assumes that road vehicle emission factors in 2021 remain the same as in 2011.
e. This assumes that road vehicle emission factors reduce between 2014 and 2021 at the current ‘official’ rates.

Baseline Dispersion Model Results

6.3.11 Baseline concentrations of nitrogen dioxide, PM\(_{10}\) and PM\(_{2.5}\) have been modelled at each of the existing receptor locations (see Figure 6.1, shown in Appendix 6.5). The results, which cover both the existing (2014) and future year (2018 and 2021) baseline (Without Scheme), are set out in Appendix 6.9. The future baseline for nitrogen dioxide covers the two scenarios: with the official reductions in vehicle emission factors and without these reductions. The modelled road components of nitrogen oxides concentrations have been adjusted by a factor of 1.89, which was derived during the model verification process (see Appendix 6.6 for details of the model verification. The modelled road components of PM\(_{10}\) and PM\(_{2.5}\) concentrations have also been adjusted by a factor of 1.89. The existing boilers within the Sainsbury’s and UTC buildings have been modelled and included in the baseline concentrations. The traffic associated with the Sainsbury’s and UTC buildings is included within the baseline traffic counts, and hence within the baseline concentrations.

6.3.12 The results are consistent with the conclusions of Haringey Council in the outcome of its air quality review and assessment work. The results are set out in Appendix 6.9.

2014 Baseline

6.3.13 The predicted annual mean concentrations of nitrogen dioxide exceed the objective at 33 of the 100 receptors at ground–floor level in 2014. These are predominately along High Road and tie in with the declaration of an AQMA by the Council. Some of these receptors are not representative of relevant exposure at ground level (shops etc.), however, at first floor level where there are relevant receptors, 26 of the 33 still exceed the objective. The annual mean nitrogen dioxide concentrations are above 60 µg/m\(^3\) at two of the receptor locations and therefore it is possible that the 1-hour mean nitrogen dioxide objective may be exceeded in some locations.

6.3.14 The predicted annual mean concentrations of PM\(_{10}\) and PM\(_{2.5}\) are below the objectives in 2014 at all receptors. The annual mean PM\(_{10}\) concentrations are below 32 µg/m\(^3\) and therefore is it unlikely that the 24-hour mean PM\(_{10}\) will be exceeded.

6.3.15 The 2014 concentrations are shown in Figure A6.9.1 to A6.9.6 in Appendix 6.9.

2018 Baseline With ‘Official’ Emission Reduction

6.3.16 The predicted annual mean concentrations of nitrogen dioxide are above the objective at 12 receptor locations (at ground level) out of 100. All of the predictions for PM\(_{10}\) and PM\(_{2.5}\) are well below the objectives. The annual mean nitrogen dioxide concentrations are below 60 µg/m\(^3\) at all of the receptor locations and therefore it is unlikely that the 1-hour mean nitrogen dioxide objective may be exceeded. The annual mean PM\(_{10}\) concentrations are below 32 µg/m\(^3\) and therefore is it unlikely that the 24-hour mean PM\(_{10}\) will be exceeded.

2018 Baseline Without Emission Reduction

6.3.17 The predicted annual mean concentrations of nitrogen dioxide are above the objective at 30 of the 100

Tottenham Athletic Football Club Limited September 2015 6.17
receptor locations (at ground level), with two receptor locations exceeding 60 µg/m³ and therefore it is possible that the 1-hour mean nitrogen dioxide objective may be exceeded.

**2021 Baseline With ‘Official’ Emission Reduction**

6.3.18 The predicted annual mean concentrations of nitrogen dioxide are above at two of the 100 receptor locations. The annual mean nitrogen dioxide concentrations are below 60 µg/m³ at all of the receptor locations and therefore it is unlikely that the 1-hour mean nitrogen dioxide objective may be exceeded.

6.3.19 All of the predictions for PM$_{10}$ and PM$_{2.5}$ are well below the objectives. The annual mean PM$_{10}$ concentrations are below 32 µg/m³ and therefore it is unlikely that the 24-hour mean PM$_{10}$ will be exceeded.

**2021 Baseline Without Emission Reduction**

6.3.20 The predicted annual mean concentrations of nitrogen dioxide are above the objective at 30 of the 100 receptor locations (at ground level), with two receptor locations exceeding 60 µg/m³ and therefore it is possible that the 1-hour mean nitrogen dioxide objective may be exceeded.

6.4 **Inherent Design Mitigation**

6.4.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered whether or not more specific mitigation is required. The Council’s saved policy ENV7 also requires development to include measures to avoid and reduce emissions where appropriate and only after this provide mitigation.

6.4.2 The Project incorporates the following good design and best practice measures:

- Scheme design such that the most sensitive uses (residential) are the furthest from the main source of pollution (High Road). The residential towers are clustered on the eastern side of the site, on the junction of Worcester Avenue and Park Lane, both with little through traffic;
- In addition, the majority of residential units are located more than 11 meters above street level, with the exception of the 5 triplex maisonettes. However, these maisonettes are set back by more than 8 meters from the kerb line and have a line of trees between them and the carriageway.
- Provision of a car club parking space;
- Provision of 1 electric vehicle “rapid charge” point per 10 car parking spaces;
- Provision of a detailed travel plan setting out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety; and
- Provision of pedestrian and cycle access to the new development, including cycle parking.
6.5 Potential Environmental Impacts and Effects

Potential Construction Phase Environmental Impacts and Effects

6.5.1 The construction of the Project will be completed over three Phases. The initial phase of the Stadium (Stadium Phase A) was begun in 2014 and is due for completion in October 2017 and includes excavation and earthworks, the construction of the northern section of the stadium and the demolition of White Hart Lane. The second phase of the Stadium (Stadium Phase B) is due to commence in May 2017 and end in August 2018 and includes the excavation and earthworks, the construction of the southern section of the stadium and podium and the construction of the Tottenham Experience. The third phase (Mixed-use Phase) is due to commence in May 2017 and complete by 2021 and includes the excavation and earthworks and construction of the hotel, Extreme Sports centre and southern residential area and plinth.

6.5.2 The construction phasing described above assumes a 12-hour working day, 7 days a week. There is an alternative construction programme proposed during which working hours will be reduced and therefore the overall construction period will be extended by 1 year. The construction impacts of the shorter working hours will be broadly the same but would occur for less time per day but for a longer period. It is considered that the assessment set out below is appropriate for both construction scenarios.

Construction Dust Impacts

6.5.3 The construction works will give rise to a risk of dust impacts during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. In each case the worst-case scenario has been considered.

Potential Dust Emission Magnitude

Demolition

6.5.4 There will be a requirement to demolish buildings with an approximate volume of 750,000 m$^3$ in total across each of the three phases. The demolition phase is expected to take place over a 6 month period. The method of demolition has not yet been decided, however, a mobile crusher is likely to be used at the site. Based on the example definitions set out in Table A6.2.1 in Appendix 6.2, the dust emission class for demolition is considered to be large.

Earthworks

6.5.5 The characteristics of the soil at the Project Site have been defined using the British Geological Survey’s UK Soil Observatory website (British Geological Survey, 2015), as set out in Table 6.5.

Table 6.5: Summary of Soil Characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Layer Thickness</td>
<td>Deep</td>
</tr>
<tr>
<td>Soil Parent Material Grain Size</td>
<td>Argillaceous $^a$</td>
</tr>
<tr>
<td>European Soil Bureau Description</td>
<td>Loam Loess</td>
</tr>
<tr>
<td>Soil Group</td>
<td>Medium to Light (Silty) to Heavy</td>
</tr>
<tr>
<td>Soil Texture</td>
<td>Clay to Clayey Loam $^b$</td>
</tr>
</tbody>
</table>

a. grain size < 0.06 mm.
b. a loam is composed mostly of sand and silt.
6.5.6 Overall, it is considered that, when dry, this soil has the potential to be slightly dusty.

6.5.7 The site where earthworks will take place covers some 70,000 m$^2$ (total for all three phases), involving removal of the foundations of the demolished buildings, excavation, haulage, tipping, stockpiling and landscaping. The excavation works will be carried out in three phases ranging from 5 to 20 months. During the earthworks dust will arise mainly from vehicles travelling over unpaved ground and from the handling of dusty materials. Based on the example definitions set out in Table A6.2.1 in Appendix 6.2, the dust emission class for earthworks is considered to be large.

Construction

6.5.8 Construction will involve a total building volume of over 100,000 m$^3$ (for all three phases). Dust will arise from vehicles travelling over unpaved ground, the handling and storage of dusty materials, and from the cutting of concrete. The construction will take place over a 75-month period. Based on the example definitions set out in Table A6.2.1 in Appendix 6.2, the dust emission class for construction is considered to be large.

Trackout

6.5.9 The number of vehicles accessing the site, which may track out dust and dirt is currently unknown, but given the size of the site it is likely that there will be a maximum of over 50 outward heavy vehicle movements per day. Based on the example definitions set out in Table A6.2.1 in Appendix 6.2, the dust emission class for trackout is considered to be large.

6.5.10 Table 6.6 summarises the dust emission magnitude for the Project.

<table>
<thead>
<tr>
<th>Source</th>
<th>Dust Emission Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demolition</td>
<td>Large</td>
</tr>
<tr>
<td>Earthworks</td>
<td>Large</td>
</tr>
<tr>
<td>Construction</td>
<td>Large</td>
</tr>
<tr>
<td>Trackout</td>
<td>Large</td>
</tr>
</tbody>
</table>

Sensitivity of the Area

6.5.11 This assessment step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the site. It also considers additional site-specific factors such as topography and screening, and in the case of sensitivity to human health effects, baseline PM$_{10}$ concentrations. The three phases of the construction of THFC and the mixed-use Project will overlap and therefore a worst-case scenario has been assumed in terms of defining sensitive receptors within the area.

Sensitivity of the Area to Effects from Dust Soiling

6.5.12 The IAQM guidance, upon which the GLA’s guidance is based, explains that residential properties are ‘high’ sensitivity receptors to dust soiling (Table A6.2.2 in Appendix 6.2). There are over 100 residential properties within 20 m of the site boundary, (see Figure 6.4, shown in Appendix 6.5). Using the matrix set out in Table A6.2.3 in Appendix 6.2, the area surrounding the on-site works is of ‘high’ sensitivity to dust soiling. Table 6.6 shows that dust emission magnitude for trackout is ‘large’ and Table A6.2.3 in Appendix
6.2 thus explains that there is a risk of material being tracked 500 m from the site exit. Since it is not known which roads construction vehicles will use, it has been assumed that all possible routes could be affected. There are over 100 residential properties within 50 m of the roads along which material could be tracked (see Figure 6.5, shown in Appendix 6.5), and Table A6.2.3 in Appendix 6.2 thus indicates that the area is of ‘high’ sensitivity to dust soiling due to trackout. Taking these points into account, it is judged that the areas surrounding the on-site works and along surrounding roads along which material may be tracked from the site are of ‘high’ sensitivity to dust soiling (Table 6.7).

**Sensitivity of the Area to any Human Health Effects**

6.5.13 Residential properties are also classified as being of ‘high’ sensitivity to human health effects, as are health centres and schools. The matrix in Table A6.2.4 in Appendix 6.2 requires information on the baseline annual mean PM$_{10}$ concentration in the area. It is considered that the modelled baseline PM$_{10}$ concentration at Receptor 37 of 24.3 µg/m$^3$ (Table 6.9.1 in Appendix 6.9) will best represent conditions near to the site, due to the proximity to the Project Site. Using the matrix in Table A6.2.4 in Appendix 6.2, the areas surrounding the on-site works and surrounding roads along which material may be tracked from the site are of ‘high’ sensitivity to human health effects (Table 6.7).

**Sensitivity of the Area to any Ecological Effects**

6.5.14 The guidance only considers designated ecological sites within 50 m to have the potential to be impacted by the construction works. There are no designated ecological sites within 50 m of the site boundary or those roads along which material may be tracked, thus ecological impacts will not be considered further.

**Table 6.7: Summary of the Area Sensitivity**

<table>
<thead>
<tr>
<th>Effects Associated With:</th>
<th>Sensitivity of the Surrounding Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>On-site Works</td>
</tr>
<tr>
<td></td>
<td>Trackout</td>
</tr>
<tr>
<td>Dust Soiling</td>
<td>High Sensitivity</td>
</tr>
<tr>
<td>Human Health</td>
<td>High Sensitivity</td>
</tr>
<tr>
<td>Ecological</td>
<td>None</td>
</tr>
</tbody>
</table>

**Risk and Significance**

6.5.15 The dust emission magnitudes in Table 6.6 have been combined with the sensitivities of the area in Table 6.7 using the matrix in Table A6.2.7 in Appendix 6.2, in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in Table 6.8. These risk categories have been used to determine the appropriate level of mitigation as set out in Section 6.7.

**Table 6.8: Summary of Risk of Impacts Without Mitigation**

<table>
<thead>
<tr>
<th>Source</th>
<th>Dust Soiling</th>
<th>Human Health</th>
<th>Ecology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demolition</td>
<td>High Risk</td>
<td>High Risk</td>
<td>None</td>
</tr>
<tr>
<td>Earthworks</td>
<td>High Risk</td>
<td>High Risk</td>
<td>None</td>
</tr>
<tr>
<td>Construction</td>
<td>High Risk</td>
<td>High Risk</td>
<td>None</td>
</tr>
<tr>
<td>Trackout</td>
<td>High Risk</td>
<td>High Risk</td>
<td>None</td>
</tr>
</tbody>
</table>

**Construction Compound**

6.5.16 The use of the construction compound may reduce the onsite construction phase dust impacts, due to the storage of materials at the construction compound rather than onsite. The earthworks and trackout impacts will remain the same. Overall, the assessment of construction impacts presented here will be
appropriate even with the use of the construction compound.

Potential Construction Traffic Impacts

6.5.17 Assuming there is no local construction compound during the construction phase, an average of 41 HGV movements per day is expected from construction vehicles accessing the site. These vehicles will travel along High Road (North of the Site) and may impact on air quality at existing properties along this road. The impacts of this construction traffic have been assessed for the year of 2016, when the number of HGVs accessing the site will be greatest. When considering the impacts described below, it should be borne in mind that these impacts are temporary and will only occur during the construction phase.

6.5.18 Predicted annual mean concentrations of nitrogen dioxide, PM$_{10}$, PM$_{2.5}$ are set out in Appendix 6.9 for both the ‘Without Scheme’ and ‘With Scheme’ scenarios. The concentrations presented include the existing Sainsbury’s and UTC boiler plant and road traffic emissions within the baseline.

6.5.19 Excavations at the site and the delivery of construction materials have been occurring since 2014. The modelled baseline includes the HGV construction traffic for these works. The ‘With Scheme’ scenario includes both the existing baseline construction vehicles as well as the construction vehicles expected in 2016. This scenario therefore double counts a small number of construction vehicles. The impacts are thus slightly over-predicted and the assessment is therefore considered robust.


6.5.20 The annual mean nitrogen dioxide concentrations are above the objective at the same 32 receptor locations that were showing exceedences without the Project, therefore the scheme is not causing the exceedences.

6.5.21 The percentage changes in concentrations, relative to the air quality objective (when rounded), are predicted to range from 0 % to 1 %. Using the matrix in Table A6.3.1 (Appendix 6.3), these impacts are described as ranging from negligible to moderate adverse due to the absolute “with Project” concentrations. The impacts are summarised in Figures A6.9.7 and A6.9.8 (Appendix 6.9).

6.5.22 The annual mean nitrogen dioxide concentrations are below 60 µg/m$^3$ at all of the receptor locations and therefore it is unlikely that the 1-hour mean nitrogen dioxide objective will be exceeded.

6.5.23 This scenario assumes the emission reductions will occur at official rates, which has not occurred to date and this is therefore considered to be an optimistic scenario.

Nitrogen Dioxide Without Emissions Reduction in 2016

6.5.24 Assuming no reduction in vehicle emissions, the annual mean nitrogen dioxide concentrations are above the objective at the same 32 receptor locations that were predicted to show exceedences without the Project, as well as at Receptor 14. The scheme is not causing the exceedences at these 32 receptor locations, but is causing a marginal exceedence at Receptor 14.

6.5.25 The percentage changes in concentrations, relative to the air quality objective (when rounded), are predicted to range from 0 % to 1 %. Using the matrix in Table A6.3.1 (Appendix 6.3), these impacts are described as ranging from negligible to moderate adverse. The impacts are summarised in Figures
A6.9.9 and A6.9.10 (Appendix 6.9). The percentage change at Receptor 14 is rounded to 0 % and thus the impact at this Receptor is described as negligible.

6.5.26 The annual mean nitrogen dioxide concentrations are below 60 µg/m$^3$ at most of the receptor locations and therefore it is unlikely that the 1-hour mean nitrogen dioxide objective will be exceeded at these locations. The annual mean nitrogen dioxide concentrations are, however, slightly above 60 µg/m$^3$ at Receptors 57 and 58, and it is possible that the 1-hour mean nitrogen dioxide objective could be exceeded at these locations. The annual mean concentrations at these two receptors are predicted to be above 60 µg/m$^3$ without the Project. The scheme is thus not causing the exceedences.

6.5.27 Although this scenario is based on worst-case assumptions, given that the expected air quality improvements have not occurred to date, this scenario is considered to be the more realistic for 2016.

**PM$_{10}$ and PM$_{2.5}$**

6.5.28 The annual mean PM$_{10}$ and PM$_{2.5}$ concentrations are below the annual mean objectives at all receptors, with or without the scheme. Furthermore, as the annual mean PM$_{10}$ concentrations are below 32 µg/m$^3$, it is unlikely that the 24-hour mean PM$_{10}$ objective will be exceeded at any of the receptors.

6.5.29 The percentage changes in both PM$_{10}$ and PM$_{2.5}$ concentrations, relative to the air quality objective (when rounded), are predicted to be zero at all of the receptors. Using the matrix in Table A6.3.1 (Appendix 6.3), these impacts are described as negligible. The impacts are summarised in Figures A6.9.11 to A6.9.14 (Appendix 6.9).

**Overall Construction Traffic Impacts in 2016**

6.5.30 There may be some moderate adverse impacts at properties along High Road but these will be temporary and not applicable when the site is fully operational.

**Construction Compound**

6.5.31 Concrete delivery is the source of the greatest anticipated number of vehicle movements to and from the Project Site during the construction works. There are no local concrete batching plant within the borough and it would be beneficial to minimise the distance concrete delivery vehicles would have to travel, thus the use of a local construction compound for concrete batching rather than sourcing concrete from batching plant outside the borough would be beneficial. A construction compound is being proposed for a site 180m along White Hart Lane from High Road. Batching concrete at this local compound would greatly reduce the distance the concrete delivery vehicles would have to travel and thereby reduce their adverse air quality impacts on the wider area.

6.5.32 There are likely to be some localised adverse impacts of this compound on the receptors along White Hart Lane; this is mainly due to the rerouting of the construction traffic. These impacts have been considered as part of this assessment for the compound, a copy of which is provided in Appendix 6.12. The air quality assessment for the construction compound focuses on localised impacts and shows that there will be moderate adverse impacts along White Hart Lane and High Road between White Hart Lane and the Site entrance due to the use of the construction compound in 2016, however, these will be short-term. It must be noted that the assessment for the construction compound evaluates the impacts in relation to the scheme as assessed without the compound, i.e. comparing the scenario where all...
construction traffic goes directly to site versus the use of the local construction compound. The use of the construction compound reduces construction traffic along High Road north of White Hart Lane, but does not remove the moderate adverse impacts of the construction traffic (paragraph 6.5.30) when compared to the baseline (no Project). The compound will, nevertheless, be beneficial along High Road north of White Hart Lane, with a very small reduction in concentrations due to the use of the construction compound.

6.5.33 The conclusions of the localised construction compound air quality impact assessment are that there will be some short-term localised adverse impacts in addition to those predicted due to the scheme without the construction compound (paragraph 6.5.30).

Significance of Construction Related Air Quality Impacts

Construction Dust

6.5.34 The IAQM does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effects will normally be not significant (Institute of Air Quality Management, 2014).

Construction Traffic

6.5.35 The construction related air quality effects without mitigation and without the construction compound are judged to be potentially significant. This professional judgement is made in accordance with the methodology set out in Appendix 6.3. More specifically, the judgement takes account of the assessment that:

- Concentrations are predicted to remain above the nitrogen dioxide objective at some locations, particularly along High Road; and
- The construction traffic impacts on nitrogen dioxide concentrations are likely to be moderate adverse at locations along High Road.

Construction Compound

6.5.36 The conclusions of the localised construction compound air quality impact assessment (see Appendix 6.12) are that there will be some short-term localised adverse impacts, which will be in addition to those predicted due to the scheme without the construction compound (paragraph 6.5.30) and therefore the effects of the construction compound are potentially significant. However, taking into account that the use of the construction compound will dramatically reduce the distance construction traffic must travel to deliver concrete to the development and therefore the benefit to the wider area, this construction compound is judged to be overall beneficial in terms of the wider impacts across the borough. Overall the effects of the construction compound are considered to be potentially significant but possibly beneficial in the wider area when compared with the scheme without the construction compound. However, both options (with and without the construction compound) would have a significant effect, although this will only be temporary.
Potential Operational Phase Environmental Impacts and Effects

Road Traffic Impacts 2018

6.5.37 Predicted annual mean concentrations of nitrogen dioxide, $\text{PM}_{10}$, $\text{PM}_{2.5}$ are set out in Appendix 6.9 for both the ‘Without Scheme’ and ‘With Scheme’ scenarios. The concentrations presented include the existing Sainsbury’s and UTC boiler plant and road traffic emissions within the baseline. The impacts in 2018 are likely to be marginally greater than shown, as boiler and generator plant that may be operational in 2018 have not been included because the exact operational loads are unknown. The 2021 scenario, which follows, does, however, provide a full assessment of road traffic, boiler and generator plant emissions with the entire Project in operation.

Nitrogen Dioxide With ‘Official’ Emissions Reduction

6.5.38 The annual mean nitrogen dioxide concentrations are above the objective at the same 12 receptor locations that were showing exceedences without the Project, therefore the scheme is not causing the exceedences.

6.5.39 The percentage changes in concentrations, relative to the air quality objective (when rounded), are predicted to range from 0 % to 1 %. Using the matrix in Table A6.3.1 (Appendix 6.3), these impacts are all described as negligible, this is largely due to the low baseline concentrations in 2018 associated with the assumed reduction in vehicle emissions. The impacts are summarised in Figures A6.9.15 and A6.9.16 (Appendix 6.9).

6.5.40 The annual mean nitrogen dioxide concentrations are below 60 µg/m$^3$ at all of the receptor locations and therefore it is unlikely that the 1-hour mean nitrogen dioxide objective may be exceeded.

Nitrogen Dioxide Without Emissions Reduction

6.5.41 This scenario assumes the emission reductions will occur at official rates which has not occurred to date and therefore is an optimistic scenario. However, with the introduction of new vehicle emission limits these reductions should start to happen.

6.5.42 Assuming no reduction in vehicle emissions, the annual mean nitrogen dioxide concentrations are above the objective at the same 30 receptor locations that were predicted to show exceedences without the Project, again the scheme is not causing the exceedences.

6.5.43 The percentage changes in concentrations, relative to the air quality objective (when rounded), are predicted to range from 0 % to 1 %. Without a reduction in vehicle emissions the baseline concentrations are significantly higher and therefore using the matrix in Table A6.3.1 (Appendix 6.3), these impacts are described as ranging from negligible to moderate adverse. The impacts are summarised in Figures A6.9.17 and A6.9.18 (Appendix 6.9).

6.5.44 The annual mean nitrogen dioxide concentrations are below 60 µg/m$^3$ at all of the receptor locations and therefore it is unlikely that the 1-hour mean nitrogen dioxide objective will be exceeded.

6.5.45 This scenario is based on worst-case assumptions and is unlikely to be realised. It is likely that the actual
concentrations will lie between the two scenarios and probably be nearer to the without emission reduction scenario in 2018 given the absence of any local downward trend over the 10 year period to 2014.

**PM**\(_{10}\) and **PM**\(_{2.5}\)**

6.5.46 The annual mean PM\(_{10}\) and PM\(_{2.5}\) concentrations are below the annual mean objectives at all receptors, with or without the scheme. Furthermore, as the annual mean PM\(_{10}\) concentrations are below 32 µg/m\(^3\), it is unlikely that the 24-hour mean PM\(_{10}\) objective will be exceeded at any of the receptors.

6.5.47 The percentage changes in both PM\(_{10}\) and PM\(_{2.5}\) concentrations, relative to the air quality objective (when rounded), are predicted to be zero at all of the receptors. Using the matrix in Table A6.3.1 (Appendix 6.3), these impacts are described as *negligible*. The impacts are summarised in Figures A6.9.19 to A6.9.22 (Appendix 6.9).

**Overall Operational Impacts in 2018**

6.5.48 There are likely to be some *slight* to *moderate adverse* impacts at properties along High Road in 2018, however, the number will depend on how effective the new cleaner Euro 6 and Euro VI vehicles are.

**Combined Road Traffic, Boiler and Generator Plant Impacts 2021**

6.5.49 Predicted annual mean concentrations of nitrogen dioxide, PM\(_{10}\), PM\(_{2.5}\), as well as percentiles for 1-hour mean nitrogen dioxide and 24-hour mean PM\(_{10}\) are presented in Appendix 6.9 for both the ‘Without Scheme’ and ‘With Scheme’ scenarios. The concentrations presented include the existing boiler plant within Sainsbury’s and UTC and the impacts of local traffic sources (road and car park), and the assumed worst-case emissions associated with boiler and generator plant provision for the site.

**Nitrogen Dioxide With ‘Official’ Emissions Reduction**

6.5.50 The annual mean nitrogen dioxide concentrations are below the objective at all relevant receptors. There are two predicted exceedances of the objective at the ground-floor level at receptors 57 and 58, although these are shops, and therefore not relevant receptors for the annual mean objective. At first-floor level these two receptors are just below the objective.

6.5.51 The percentage changes in concentrations, relative to the air quality objective (when rounded), are predicted to range between 0 % and 2 %. Using the matrix in Table A6.3.1 (Appendix 6.3), the impacts at ground level are described as *negligible* at all receptor locations apart from three, where there is predicted to be one *slight adverse* impact (Receptor 56) and two *moderate adverse* impacts (Receptors 57 and 58). The moderate adverse impacts occur at ground level, which does not count as a relevant receptor for the objectives, at first floor the impacts is slight adverse. Overall, there are three slight adverse impacts at relevant receptors. The impacts are summarised in Figures A6.9.23 and A6.9.24 (Appendix 6.9). The *slight adverse* impacts are predominately due to the combined effect of the Project related traffic and the diesel generator emissions. The boiler emissions make only a small contribution.

6.5.52 Predicted percentile concentrations are all below the objective of 200 µg/m\(^3\), with the highest predicted 99.8\(^{th}\) percentile of 1-hour mean concentrations being 176.6 µg/m\(^3\). Therefore the short-term nitrogen dioxide objective will not be exceeded.
6.5.53 This scenario assumes the emission reductions will occur at official rates which has not occurred to date and therefore is an optimistic scenario. However, with the introduction of new vehicle emission limits these reductions should start to happen.

**Nitrogen Dioxide Without Emissions Reduction**

6.5.54 Assuming no reduction in vehicle emissions, the annual mean nitrogen dioxide concentrations are above the objective at 30 of the 100 existing receptors locations.

6.5.55 The percentage changes in concentrations, relative to the air quality objective (when rounded), are predicted to range from 0 % to 3 %. Using the matrix in Table A6.3.1 (Appendix 6.3), these impacts are described as negligible to substantial adverse. The impacts are summarised in Figures A6.9.25 and A6.9.26 (Appendix 6.9). The adverse impacts are predominately due to either the Project related traffic or the diesel generator emissions or the combined effect of both. The boiler emissions have a lesser impact than either the road impacts or the generator impacts.

6.5.56 Predicted percentile concentrations are all below the objective of 200 $\mu$g/m$^3$, with the highest predicted 99.8th percentile of 1-hour mean concentrations of 185.0 $\mu$g/m$^3$. Therefore the short-term nitrogen dioxide objective will not be exceeded.

6.5.57 This scenario is based on worst-case assumptions and is unlikely to be realised. It is likely that the actual concentrations will lie between the two scenarios and should be nearer to the without emission reduction scenario in 2021 given the expected performance of the new vehicle emission standards.

**PM$_{10}$ and PM$_{2.5}$**

6.5.58 The annual mean PM$_{10}$ and PM$_{2.5}$ concentrations are below the annual mean objectives at all receptors, with or without the scheme. Furthermore, the relevant percentile of 24-hour mean concentrations is below the objective of 50 $\mu$g/m$^3$ (based on the headroom methodology explained in Appendix 6.6). Therefore the short-term PM$_{10}$ objective will not be exceeded.

6.5.59 The percentage changes in both PM$_{10}$ and PM$_{2.5}$ concentrations, relative to the air quality objective (when rounded), are predicted to range from 0 % to 2 % for PM$_{10}$ and 0% to 3% for PM$_{2.5}$. Using the matrix in Table A6.3.1 (Appendix 6.3), the impacts of PM$_{10}$ are described as negligible at most receptors although slight adverse at five receptor locations (Receptors 64, 65, 67, 76 and 79) and moderate adverse at one receptor location (Tower A). The impacts of PM$_{2.5}$ are described as negligible at most receptors although slight adverse at seven receptor locations (Receptors 60, 61, 64, 65, 66, 74 and 91) and moderate adverse at three receptor locations (Receptor 67, 76 and 79). These adverse impacts are predominately due to the diesel generators and the adverse impacts occur to the north east of the stadium generator flues (downwind, in relation to the prevailing wind direction). The impacts are likely to be over-estimate because the specific PM$_{10}$ and PM$_{2.5}$ emission rates of the generators are unknown and a single PM emission rate set at the limit was modelled. Furthermore, the proportion of this PM emission that is PM$_{10}$ and PM$_{2.5}$ will be slightly less than was modelled. The impacts are summarised in Figures A6.9.27 to A6.9.30 (Appendix 6.9).

**Overall Operational Impacts in 2021**

6.5.60 There are likely to be a small number of adverse impacts at properties along High Road at relevant receptor locations due mainly to road traffic, however, in the wider study area the impacts are mainly
negligible. There are also likely to be adverse impacts due to the operation of the stadium generator plant, in particular to the northeast of the stadium.

Impacts on the Project

6.5.61 Predicted air quality conditions for residents of the Project are set out in Appendix 6.9 (Figure 6.2 for receptor locations, shown in Appendix 6.5). Table 6.9 shows the maximum concentration in each part of the Project. All of the values are below the objectives. Furthermore not all of the objectives apply to all the locations shown in the table. For example the Walkway does not represent annual mean exposure or 24-hour mean exposure, however, concentrations have been presented for information. Air quality for future residents within the Project Site and users of the development will thus be acceptable. These predictions are based on the assumed usage of the on-site boiler and generator plant. The generator plant are a far more significant contributor to the concentrations even though their usage is limited (292 hours annual for the stadium generator and 52 hours annually for the back-up generators, these durations include maintenance). This conclusion is therefore based on the generators being operational for no more time than has been modelled.

<table>
<thead>
<tr>
<th>Location</th>
<th>Annual Mean</th>
<th>Short term</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO₂</td>
<td>PM₁₀</td>
</tr>
<tr>
<td></td>
<td>With Reduction</td>
<td>Without Reduction</td>
</tr>
<tr>
<td>Stadium</td>
<td>23.1</td>
<td>28.4</td>
</tr>
<tr>
<td>Walkway</td>
<td>34.3</td>
<td>47.8</td>
</tr>
<tr>
<td>NE Building</td>
<td>22.9</td>
<td>27.9</td>
</tr>
<tr>
<td>Residential</td>
<td>25.0</td>
<td>31.5</td>
</tr>
<tr>
<td>Extreme</td>
<td>26.0</td>
<td>33.4</td>
</tr>
<tr>
<td>Hotel</td>
<td>26.0</td>
<td>32.7</td>
</tr>
<tr>
<td>Objective</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

a. This assumes that road vehicle emission factors in 2021 remain the same as in 2011.
b. This assumes that road vehicle emission factors reduce between 2014 and 2021 at the current ‘official’ rates.

Significance of Operational Air Quality Impacts

6.5.62 The operational air quality effects without mitigation are judged to be potentially significant. This professional judgement is made in accordance with the methodology set out in Appendix 6.3, and also takes into account of the results for both assessment years (2018 and 2021). It also takes account of the uncertainty over future projections of traffic-related nitrogen dioxide concentrations, which may not decline as rapidly as expected using the ‘official’ emission factors for motor vehicles. The latter has been addressed by giving consideration to both sets of modelled results for nitrogen dioxide; those with and without reductions in traffic emissions. It is expected that concentrations will fall in the range between the two sets of results, although by 2021 the impacts should be closer to the ‘without reduction’ results than the ‘with reduction’ results.

6.5.63 More specifically, the judgement that the air quality effects will be significant without mitigation takes account of the assessment that:

- concentrations are predicted to remain above the nitrogen dioxide objective at some locations;
- the operational impacts on nitrogen dioxide concentrations are likely to be at least slight adverse at
some locations, mainly along High Road;  
  - the PM concentrations are all below the objectives, however, the impacts are slight to moderate adverse at a number of receptors particularly to the northeast of the stadium, which is due to the PM emissions from the generators; and  
  - the short-term nitrogen dioxide and PM\textsubscript{10} objectives will not be exceeded providing the operations of the generators does not exceed the modelled number of operating hours.

‘Air Quality Neutral’

**Building Emissions**

6.5.64 Based on the installation of boilers that conform to the London SPG, which requires the installation of ultra-low NOx boilers (<40 mg/kWh of NOX) and generators conforming to stage IIIA emission limits the total NOx and PM emission from all of the proposed boilers and generators will be 26,183 kg/annum. Appendix 6.7 shows the Building Emissions Benchmarks (BEBs) for each land use category. Table 6.10 shows the calculation of the BEBs for this Project.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stadium</td>
<td></td>
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</tr>
<tr>
<td>A Gross Internal Floor Area (m(^2))</td>
<td>119,945</td>
<td>Project Team</td>
</tr>
<tr>
<td>B BEBs (g/m(^2)/annum)</td>
<td>NO\textsubscript{x} \ PM\textsubscript{10}</td>
<td>284 16.3 Table A6.7.1</td>
</tr>
<tr>
<td>Tottenham Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Gross Internal Floor Area (m(^2))</td>
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<td>Project Team</td>
</tr>
<tr>
<td>D BEBs (g/m(^2)/annum)</td>
<td>NO\textsubscript{x} \ PM\textsubscript{10}</td>
<td>22.6 1.29 Table A6.7.1</td>
</tr>
<tr>
<td>Hotel</td>
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<td>E Gross Internal Floor Area (m(^2))</td>
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<td>Project Team</td>
</tr>
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<td>NO\textsubscript{x} \ PM\textsubscript{10}</td>
<td>70.9 4.07 Table A6.7.1</td>
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<td>G Gross Internal Floor Area (m(^2))</td>
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<td>Project Team</td>
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<td>284 16.3 Table A6.7.1</td>
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<td>Residential Towers</td>
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</tr>
<tr>
<td>I Gross Internal Floor Area (m(^2))</td>
<td>64,231</td>
<td>Project Team</td>
</tr>
<tr>
<td>J BEBs (g/m(^2)/annum)</td>
<td>NO\textsubscript{x} \ PM\textsubscript{10}</td>
<td>26.2 2.28 Table A6.7.1</td>
</tr>
<tr>
<td>Community Health Centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K Gross Internal Floor Area (m(^2))</td>
<td>2,000</td>
<td>Project Team</td>
</tr>
<tr>
<td>L BEBs (g/m(^2)/annum)</td>
<td>NO\textsubscript{x} \ PM\textsubscript{10}</td>
<td>43 2.47 Table A6.7.1</td>
</tr>
<tr>
<td>M Total BEBs Emissions (kg/annum)</td>
<td>37,861</td>
<td>(A x B + C x D + E x F + G x H + I x J + K x L)/1000</td>
</tr>
</tbody>
</table>

6.5.65 The Total Building NOx Emission of 26,183 kg/annum is less than Total BEB NOx Emission of 37,861 kg/annum. The Total Building PM\textsubscript{10} Emission of 1,299 kg/annum is less than Total BEB PM\textsubscript{10} Emission of 2,223 kg/annum. The Project is thus better than air quality neutral in terms of building emissions.
**Road Transport Emissions**

6.5.66 The Transport Emissions Benchmarks (TEBs) are based on the number of car trips generated by different land-use classes, together with the associated trip lengths and vehicle emission rates. However, the GLA has only published TEBs for a limited number of land-use categories due to the non-availability of robust data for their calculation. Where TEBs have not been derived for specific land-use classes, it is possible to compare Project-related trip rates with benchmarked trip rates.

6.5.67 Appendix 6.7 provides default values for the average trip length for residential properties and B1 offices in Inner London, as well as the average NOx and PM$_{10}$ emissions per vehicle-kilometre. This information has been used to calculate the transport emissions generated by these elements of the Project (Table 6.11). These have then been compared with the TEBs for the Project set out in Table 6.12. For the elements of the Project for which it has not been possible to calculate TEBs, the trip rates provided by the project team and shown in Table 6.13 in have been compared with the benchmarked trip rates provided in Appendix 6.7 (Table 6.14).

6.5.68 The Transport Emissions for the residential towers and the Tottenham Experience (95 kg/annum for NOX and 17 kg/annum for PM$_{10}$) are less than the Transport Emissions Benchmarks for these elements of the Project (944 kg/annum for NOX and 169 kg/annum for PM$_{10}$) for both NOx and PM$_{10}$. Furthermore, the annual trip rates for the remaining elements of the Project (see Table 6.13) are less than the corresponding benchmark trip rates (see Table 6.14). The Project is thus better than air quality neutral in terms of transport emissions.

### Table 6.11: Calculation of Transport Emissions for the Project

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential Towers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Total Vehicle Trips per Year *</td>
<td>143,810</td>
<td>Project Team</td>
</tr>
<tr>
<td>B Average Distance per Trip (km)</td>
<td>3.7</td>
<td>Table A6.7.3</td>
</tr>
<tr>
<td>C Emissions per Vehicle-km (g)</td>
<td>NOx: 0.37, PM$_{10}$: 0.0665</td>
<td>Table A6.6.4</td>
</tr>
<tr>
<td>D Transport Emissions (kg/annum)</td>
<td>NOx: 197, PM$_{10}$: 35</td>
<td>A x B x C / 1,000</td>
</tr>
<tr>
<td><strong>Tottenham Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Total Vehicle Trips per Year *</td>
<td>43,320</td>
<td>Project Team</td>
</tr>
<tr>
<td>F Average Distance per Trip (km)</td>
<td>5.9</td>
<td>Table A6.7.3</td>
</tr>
<tr>
<td>G Emissions per Vehicle-km (g)</td>
<td>NOx: 0.37, PM$_{10}$: 0.0665</td>
<td>Table A6.7.4</td>
</tr>
<tr>
<td>H Transport Emissions (kg/annum)</td>
<td>NOx: 95, PM$_{10}$: 17</td>
<td>E x F x G / 1,000</td>
</tr>
</tbody>
</table>

a. Each trip is 1-way (i.e. a return journey would be two trips).

### Table 6.12: Calculation of Transport Emissions Benchmarks for the Project

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential Towers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Number of Dwellings</td>
<td>580</td>
<td>Project Team</td>
</tr>
<tr>
<td>B Benchmark Emissions (g/dwelling/annum)</td>
<td>NOx: 558, PM$_{10}$: 100</td>
<td>Table A6.7.2</td>
</tr>
<tr>
<td>C Residential TEBs</td>
<td>NOx: 324, PM$_{10}$: 58</td>
<td>A x B / 1,000</td>
</tr>
<tr>
<td><strong>Tottenham Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D Gross Internal Floor Area (m$^2$)</td>
<td>4,311</td>
<td>Project Team</td>
</tr>
<tr>
<td>E Benchmark Emissions (g/m$^2$/annum)</td>
<td>NOx: 219, PM$_{10}$: 39.3</td>
<td>Table A6.7.2</td>
</tr>
<tr>
<td>F TEBs</td>
<td>NOx: 944, PM$_{10}$: 169</td>
<td>D x E / 1,000</td>
</tr>
</tbody>
</table>
Table 6.13: Trip Rates for the Project

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stadium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Vehicle Trips per Year</td>
<td>60,766</td>
<td>Project Team</td>
</tr>
<tr>
<td>Hotel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Vehicle Trips per Year</td>
<td>87,053</td>
<td>Project Team</td>
</tr>
<tr>
<td>Extreme Sports Centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Vehicle Trips per Year</td>
<td>20,000</td>
<td>Project Team</td>
</tr>
<tr>
<td>Community Health Centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Vehicle Trips per Year</td>
<td>79,511</td>
<td>Project Team</td>
</tr>
</tbody>
</table>

a Each trip is 1-way (i.e. a return journey would be two trips).

Table 6.14: Benchmarks Trip Rates for the Project

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stadium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benchmark Trip Rate (trips/annum)</td>
<td>2,698,763</td>
<td>Project Team</td>
</tr>
<tr>
<td>Hotel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benchmark Trip Rate (trips/annum)</td>
<td>94,099</td>
<td>Project Team</td>
</tr>
<tr>
<td>Extreme Sports Centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benchmark Trip Rate (trips/annum)</td>
<td>47,228</td>
<td>Project Team</td>
</tr>
<tr>
<td>Community Health Centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benchmark Trip Rate (trips/annum)</td>
<td>130,200</td>
<td>Project Team</td>
</tr>
</tbody>
</table>

6.6 Additional Mitigation, Compensation and Enhancement Measures

Construction Impacts

Construction Dust Impacts

6.6.1 Measures to mitigate dust emissions will be required during the construction phase of the Project in order to reduce impacts upon nearby sensitive receptors.

6.6.2 The site has been identified as a High Risk site for dust soiling during demolition, earthworks, construction and trackout and as a High Risk site for human health during demolition and Medium Risk site for human health during earthworks, construction and trackout, as set out in Table 6.8. The GLA’s SPG on The Control of Dust and Emissions During Construction and Demolition (GLA, 2014b) describes measures that should be employed, as appropriate, to reduce the impacts, along with guidance on what monitoring that should be undertaken during the construction phase. This reflects best practice experience and has been used, together with the professional experience of the consultant and the findings of the dust impact assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in Appendix 6.10.

6.6.3 The mitigation measures should be written into a dust management plan (DMP). The DMP may be integrated into a Code of Construction Practice or the Construction Environmental Management Plan, and may require monitoring. The GLA’s guidance suggests that, for a Medium to High Risk site, automatic monitoring of particulate matter (as PM$_{10}$) will be required. It also states that, on certain sites, it may be appropriate to determine the existing (baseline) pollution levels before work begins. However, the guidance is clear that the Local Authority should advise as to the appropriate air quality monitoring procedure and timescale on a case-by-case basis.

6.6.4 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.
Construction Traffic Impacts

6.6.5 The scheme may cause some moderate adverse impacts due to additional traffic along High Road. Emissions from road traffic are being addressed principally through the introduction of more stringent emission standards, via European legislation.

6.6.6 The conclusions of the localised construction compound air quality impact assessment are that there will be some short-term localised adverse impacts in addition to those predicted due to the scheme without the construction compound (paragraph 6.5.30). The assessment goes further and states that although additional mitigation is not required, mitigation measures to further minimise the localised impacts could be implemented including using, as a minimum, Euro VI vehicles for the transport of concrete to and from the Project Site from the construction compound. And the possibility of electric or hybrid vehicles for transport between the construction compound and the Project Site could be considered if they are feasible and commercially available.

Operational Road Traffic Impacts

6.6.7 The assessment has demonstrated that the scheme will not cause any exceedences of the air quality objectives in areas where they are not currently exceeded.

6.6.8 The scheme may cause some adverse impacts due to additional traffic. Emissions from road traffic are being addressed principally through the introduction of more stringent emission standards, via European legislation. The Council’s Air Quality Action Plan will also help reduce emissions, as will the Mayor’s Air Quality Strategy.

6.6.9 In addition, Policy 6.13 of the London Plan (GLA, 2015) outlines that “developments must…ensure that 1 in 5 spaces (both active and passive) provide an electrical charging point to encourage the uptake of electric vehicles”. Table 6.2 of the London Plan further emphasises that, for retail developments, 10% of all car parking spaces must be for electric vehicles, with an additional 10% passive provision for electric vehicles; for employment (B1) developments, 20% of all car parking spaces must be for electric vehicles, with an additional 10% passive provision for electric vehicles; and for residential developments, 20% of all car parking spaces must be for electric vehicles, with an additional 20% passive provision for electric vehicles. The Project will include this allowance for electric vehicle charging points, which will assist in minimising the impacts of the development, as identified in Section 0, as the uptake of electric vehicles increases.

Energy Plant Impacts

6.6.10 In order to conform with the Clean Air Act, the local authority’s approval regarding the height of the flues will be required for the plant to be installed in this scheme.

6.6.11 The boiler and generator plant flues will conform with the specifications to minimise air quality impacts set out in the GLA’s Sustainable Design and Construction SPG (GLA, 2014a), which includes the requirement that all stacks should discharge vertically upwards and be unimpeded by any fixture on top of the stack (e.g., rain cowls or ‘Chinaman’s Hat’).

6.6.12 Although the SPG does not specifically state it, it is also generally considered best practice for plant to have a flue terminating at least 1 m above the roof level, which will be the case for this scheme. In
addition, in order to ensure good dispersion all boiler flues will be designed to emit emissions with a velocity of at least 7.5 m/s, which is the minimum velocity that has been modelled.

6.6.13 Further requirements from the SPG are set out in Appendix 6.11, which also details the specifications of the plant used to assess the boiler and generator impacts. If the installed plant do not conform to these specifications, additional assessment and/or mitigation may be required. Appendix 6.11 also sets out measures included in Technical Guidance Note D1 (Dispersion) (HMSO, 1993b) to ensure adequate dispersion of emissions from discharging stacks and vents.

6.6.14 The two back-up generators in the hotel and residential block have been assumed to be stage IIIA generators in relation to emissions. The EU does not regulate stationary prime or emergency standby installations, although some individual member countries do for example the TA Luft regulations in Germany. The UK does not have any regulations that apply. The generators used specifically as stationary emergency power provision in the hotel and residential tower block are therefore not required to conform to the Stage IIIA emission limits. Similarly the stationary stadium generators are not required to conform to emission limits. Although they have been modelled with emissions rates based on the Stage IIIA emission limits and using plant that does not meet these basic emission rates would lead to significantly worst impacts.

6.6.15 If the stationary non-road generator conformed to the non-road mobile machinery Stage IV emission limits (in force from 2014) or proposed Stage V emission limits, which would apply from 2019 the impacts would be significantly reduced. For generators with a net power greater than 560 kW (the stadium generators), Stage V emission limits for NOx are 0.67 g/kWh (19% of the rate modelled, which is based on Stage IIIA emissions) and 0.035 g/kWh for PM emission (17.5% of the rate modelled, which is based on Stage IIIA emissions). These Stage V emission limits are in line with the US EPA Tier 4 limits which are currently in force in the USA. For generators with a net power less than 560 kW (the hotel and residential generators) these are 0.40 g/kWh (11% of the rate modelled, which is based on Stage IIIA emissions) and 0.015 g/kWh for PM emission (7.5% of the rate modelled, which is based on Stage IIIA emissions). This is again in line with the US EPA Tier 4 limits.

6.6.16 Stage V is currently only proposed to be required for mobile plant installed in or after 2019. Using Stage V (US EPA Tier 4) generators is not a requirement but will help to substantially reduce emissions and hence minimise and reduce any possible adverse impacts.

**Air Quality Neutral**

6.6.17 The air quality neutral policy is intended to minimise the cumulative impacts of many schemes throughout London. The Project is better than air quality neutral and therefore no additional measures to offset cumulative impacts of the scheme are required.

6.7 **Assessment Summary and Residual Impacts and Effects**

**Construction Dust Impacts**

6.7.1 The IAQM guidance is clear that, with appropriate mitigation in place, the residual effect will normally be 'not significant'. The mitigation measures set out in Appendix 6.10 are based on the IAQM guidance. With these measures in place and effectively implemented the residual effects are judged to be *not significant.*
6.7.2 The IAQM guidance does, however, recognise that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. During these events, short-term dust annoyance may occur, however, the scale of this would not normally be considered sufficient to change the conclusion that overall the effects will be *not significant*.

**Construction Traffic Impacts**

6.7.3 Without the construction compound the residual impacts will be the same as those identified in Section 6.5 (paragraphs 6.5.17 to 6.5.30) and the temporary impacts of the construction traffic would remain as *moderate adverse* and the effects are considered potentially *significant*, although temporary.

6.7.4 If the construction compound is utilised then the residual impacts for receptors along High Road north of White Hart Lane, where adverse impacts have been predicted, will be reduced marginally, but are likely to remain *moderate adverse* compared with the baseline. Additional *moderate adverse* impacts may be introduced along White Hart Lane. Taking account that the use of the construction compound will dramatically reduce the distance construction traffic must travel to deliver concrete to the development and therefore the benefit to the wider area by using the construction compound, this construction compound is judged to be overall beneficial in terms of the wider impacts across the borough. Although the local impacts would remain *moderate adverse* and the effects are considered potentially *significant*, although temporary.

**Boiler and Generator Plant Impacts**

6.7.5 If the installed generator plant conform to Stage IIIA emission limits the residual impacts will be the same as those previously identified in this Chapter, and will be at least slight adverse. However, if cleaner generators are installed, for example conforming to stage V (US EPA Tier 4), then the impacts will be significantly less.

**Road Traffic Impacts**

6.7.6 The residual impacts will be the same as those identified in Section 6.6. The impacts of the Project will remain as slight adverse. Impacts in 2021 include the boiler and generator plant and by using cleaner generators the impacts would be minimised, however, there will still be adverse impacts along High Road due to road traffic.

**Cumulative Impacts and Effects**

6.7.7 The construction phase is expected to be completed by 2021 and there are no other significant developments in the local area that may cause cumulative effects during the construction phase.

6.7.8 From 2021 onwards, when the Project will be operational, there are no significant developments consented in the local area. The High Road West (HRW) development, which currently isn’t consented, will be fully operational from 2024 onwards. The additional traffic generated by HRW development may cause cumulative effects on air quality in the local area. In the future there may also be some minor developments in the area that may lead to cumulative effects. The traffic data used in the assessment assume no growth in the baseline traffic. The baseline traffic has been decreasing in recent years and is expected to continue to decrease in the future. Taking these points into account, the baseline traffic used in the assessment is likely to account for increases in traffic due to the High Road West development and
other minor developments. The cumulative effects are thus judged to be not significant.

Conclusion

6.7.9 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emission. With these measures in place, it is expected that any residual effects will be not significant. However, the guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be not significant.

6.7.10 The construction and operational impacts of increased traffic emissions arising from the additional traffic on local roads, due to the Project, and the newly introduced emissions from the on-site boilers and generators have been assessed. Concentrations have been modelled for 100 receptor locations within the study area, including locations where impacts are expected to be greatest. In addition, the impacts of traffic from local roads on the air quality for future residents have been assessed at a number of locations within the Project Site itself. In the case of nitrogen dioxide, the modelling has been carried out assuming both that vehicle emissions decrease (using 'official' emission factors), and that they do not decrease in future years. This is to allow for uncertainty over emission factors for nitrogen oxides identified by Defra (Carslaw, Beevers, Westmoreland, & Williams, 2011).

6.7.11 The predicted annual mean concentrations of nitrogen dioxide exceed the objective in 2014 at a large number of the receptors. This number reduces in 2016, 2018 and 2021 due to reductions in vehicle emissions, although there are still predicted to be a small number of exceedences. These are predominately along High Road and tie in with the declaration of an AQMA by the Council. The results are consistent with the conclusions of Haringey Council in the outcome of its air quality review and assessment work.

6.7.12 The impacts of increased traffic during the construction phase have been assessed in detail assuming that there is no local construction compound. There may be some moderate adverse impacts at properties along High Road but these will be temporary and not applicable when the site is fully operational. During the construction period the effects may be potentially significant, although temporary. If the construction compound is utilised then the impacts for receptors along High Road north of White Hart Lane, where adverse impacts have been predicted, will be reduced marginally, but are likely to remain moderate adverse compared with the baseline. Additional moderate adverse impacts may be introduced along White Hart Lane. Taking into account that the use of the construction compound will dramatically reduce the distance construction traffic must travel to deliver concrete to the Project Site and therefore the benefit to the wider area of the construction compound, this construction compound is judged to be overall beneficial compared with the scheme without the construction compound. Nevertheless, the local impacts would remain moderate adverse and the effects are considered potentially significant, although temporary.

6.7.13 The operational air quality impacts without mitigation are judged to be potentially significant. This takes account of the assessment that:
concentrations are predicted to remain above the nitrogen dioxide objective at some locations;

- the impacts on the nitrogen dioxide concentrations are likely to be slight adverse at some locations, mainly along High Road due to both road traffic and generator plant emissions and to a smaller degree boiler plant emissions;

- the PM concentrations are all below the objectives, however, the impacts are slight to moderate adverse at a number of receptors particularly to the northeast of the stadium, due to the PM emissions from the generators. In particular there are moderate adverse impacts at the residential tower to the northeast of the stadium, which will represent a large number of receptors; and

- the short-term nitrogen dioxide and PM\textsubscript{10} objectives will not be exceeded providing the operations of the generators does not exceed the modelled number of operating hours assessed.

6.7.14 The impacts of local traffic and the boiler and generator plant on the air quality for new residents living within the Project have been shown to be acceptable at the worst-case locations assessed, with concentrations being well below the air quality objectives.

6.7.15 The overall operational air quality impacts of the Project without additional mitigation are judged to be significant.

6.7.16 No additional mitigation has been proposed for the operational impacts, however, mitigation measures to reduce and minimise the impacts of the on-site diesel generators could be included by specifying a requirement for the generators to conform to emission limits defined for Stage IV or V non-road machinery and equipment. These are not strictly applicable to stationary generator sets: Stage V is not due to be implemented until 2019 although it is in line with the US EPA Tier 4 emission limits which are already in force in the USA. Enforcing the stricter emission limits should remove the adverse PM impacts due to the generator plant and minimise the adverse nitrogen dioxide impacts at the locations near to the significant road traffic impacts (High Road).

6.7.17 The building and transport related emissions associated with the Project are both below the relevant air quality neutral benchmarks. The Project therefore complies with the requirement that all new developments in London should be at least air quality neutral. The Project is better than air quality neutral and is thus compliant with Policy 7.14 of the London Plan.
## Table 6.15 Air Quality Assessment Summary

<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance</th>
<th>Additional Mitigation</th>
<th>Residual Impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Dust Impacts</td>
<td>High</td>
<td>Negative</td>
<td>n/a</td>
<td>n/a</td>
<td>A package of mitigation measures</td>
<td>n/a</td>
<td>Neutral</td>
</tr>
<tr>
<td>Construction Traffic Impact – No Local Construction Compound</td>
<td>High</td>
<td>Negative</td>
<td>Very Low</td>
<td>Minor</td>
<td>None</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td>Construction Traffic Impact – Local Construction Compound</td>
<td>High</td>
<td>Negative</td>
<td>Very Low</td>
<td>Minor</td>
<td>None</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td><strong>Operational Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation Traffic Impact in 2018 – Nitrogen Dioxide</td>
<td>High</td>
<td>Negative</td>
<td>Very Low</td>
<td>Minor</td>
<td>None</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td>Operation Traffic Impact in 2018 – PM</td>
<td>High</td>
<td>Negative</td>
<td>Negligible</td>
<td>Neutral</td>
<td>None</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Combined Energy Plant and Operational traffic Impact in 2021 – Nitrogen Dioxide</td>
<td>High</td>
<td>Negative</td>
<td>Low</td>
<td>Moderate</td>
<td>None</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Combined Energy Plant and Operational traffic Impact in 2021 – PM</td>
<td>High</td>
<td>Negative</td>
<td>Low</td>
<td>Moderate</td>
<td>Onsite generators with lower emission limits</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
</tbody>
</table>
7. Archaeology

7.1 Introduction

7.1.1 This chapter has been produced by L - P : Archaeology. This chapter assesses the potential impact on the buried archaeology.

7.1.2 For the purposes of clarity, the following terms are used in this report:

- Project Site – all land within the ‘red line’ boundary which constitutes the project development area; and
- The ‘Study Area’ – land within a 500m radius of the centre point (NGR 534003, 191256) of The Project Site that has been used to characterise and contextualise the archaeological record.

7.2 Assessment Criteria and Methodology

7.2.1 The chapter will focus solely on the issue of buried archaeology. It will assess the potential significance of the impact of the Project on the resource and define a programme of suitable mitigation to avoid, reduce or compensate for potential significant impacts. Above ground heritage is considered in Chapter 8 (Cultural Heritage).

Previous Assessment

7.2.2 The Project Site has been subject to three stages of previous archaeological study which includes:

- Desk Based Assessment\(^8\) (Appendix 7:1);
- Archaeological Evaluation Phase I\(^9\) (Appendix 7:2); and
- Archaeological Evaluation Phase II\(^10\) (Appendix 7:3).

7.2.3 The results of these previous levels of assessment help to form the baseline data collection for this chapter.

Scoping Opinion

7.2.4 Although a formal Scoping Opinion was not sought, the Scope of the EIA was based on the technical scope for the original 2010 ES and the Southern Addendum. A draft Scoping Report was sent to the Council on 19th June 2015 for their informal comments and discussion. No informal comments were received in relation to the Archaeology assessment.

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Legislative Context

7.2.5 The following items of statutory legislation have been considered in relation to this chapter:

- Ancient Monuments and Archaeological Areas Act 1979;
- Town and Country Planning Act 1990;
- The Planning and Compulsory Purchase Act 2004; and

Planning Policy and Guidance

National Planning Policy

7.2.6 The following national policy is considered relevant to this assessment: National Planning Policy Framework 2012, Chapter 12: Conserving and Enhancing the Historic Environment11.

Local Planning Policy

7.2.7 The following regional and local policy is considered relevant to this assessment:

- The London Plan 2011 (revised 2015); Chapter 7.8: Heritage Assets and Archaeology12;
- Key Planning Policy; and
- The adopted Strategic Policies for Haringey (2013) has superseded the Unitary Development Plan (UDP) to become the main statutory plan for the borough. The London Borough of Haringey saved UDP Policy CSV8 (adopted 2006, saved March 2013).

Guidance/Best Practice

7.2.8 This chapter and the reports that have formed its baseline data adhere to the following guidance and best practice papers:

- Historic Environment Good Practice Advice Notes 1, 2 and 313;
- CIfA Standard and Guidance for Historic Environment Desk Based Assessment14;
- CIfA Standard and Guidance for Archaeological Field Evaluation15;
- Design Manual for Roads and Bridges Volume 11, Section 3, Part 216;
- Environmental Impact Assessment: A handbook for scoping projects17, Environment Agency 2002; and
- Environmental Impact Assessment: A Guide to good practice and procedures18, DCLG 2011 (updated April

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11 Department for Communities and Local Government 2012 'National Planning Policy Framework; Chapter 12 Conserving and Enhancing the Historic Environment' p30-32.
12 The Mayor of London Plan 2015. (Consolidated with alterations since 2011) Chapter 7 Policy 8 p286
13 Historic England 2015 ‘Good Practice Advice Notes 1,2 and 3’.
14 CIfA 2014 ‘Standards and Guidance for Desk Based Assessment’.
15 CIfA 2014 ‘Standards and Guidance for Archaeological Field Evaluation’.
16 Department for Transport 2007 ‘DMRB Volume 11, Section 3, Part 2, Cultural Heritage’.
Baseline Data Collection

7.2.9 The evidence base comprises archaeological assets within the Study Area.

7.2.10 The following sources were consulted:

- The results of archaeological trial trenching carried out in the north of the site in 2010 and in the south of the site in 2014;
- The Greater London Historic Environment Record (GLHER);
- The National Monuments Record (NMR);
- Geological information;
- Historic maps;
- Data collected through site visits;
- Published and unpublished archive reports of previous archaeological works held at Greater London Archaeological Advisory Service; and
- Previous consultation with Historic England’s Greater London Archaeological Advisory Service, who act as advisors to the local planning authority, dated 28th February 2012 and 24th June 2014 and May 2015.

Assessment Methodology

7.2.11 The following criteria from the Design Manual for Roads and Bridges (DMRB)\textsuperscript{19} are used in this assessment:

<table>
<thead>
<tr>
<th>Significance</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>World Heritage Sites (including nominated sites); assets of acknowledged international importance; assets that can contribute significantly to acknowledged international research objectives</td>
</tr>
<tr>
<td>High</td>
<td>Scheduled Monuments (including proposed sites); undesignated assets of schedulable quality and importance; assets that can contribute significantly to acknowledged national research objectives</td>
</tr>
<tr>
<td>Medium</td>
<td>Designated or undesignated assets that contribute to regional research objectives</td>
</tr>
<tr>
<td>Low</td>
<td>Designated and undesignated assets of local importance; assets compromised by poor preservation and/or poor survival of contextual associations; assets of limited value, but with potential to contribute to local research objectives</td>
</tr>
<tr>
<td>Negligible</td>
<td>Assets with very little or no surviving archaeological interest</td>
</tr>
<tr>
<td>Unknown</td>
<td>The importance of the resource has not been ascertained</td>
</tr>
</tbody>
</table>

7.2.12 The magnitude of the impact is measured using the following scale which has been taken from the DMRB. It should be noted that the magnitude of impact on buried archaeological deposits may be

\textsuperscript{18} Department for Communities and Local Government Rev.2015 ‘Environmental Impact Assessment: A guide to good procedures’.
uncertain, and where this is the case it has been noted within the assessment.

### Table 7.2 Factors in the assessment of magnitude of impacts on archaeological remains

<table>
<thead>
<tr>
<th>Magnitude</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>Change to most or all key archaeological materials, such that the resource is totally altered; comprehensive changes to setting</td>
</tr>
<tr>
<td>Moderate</td>
<td>Changes to many key archaeological materials, such as that the resource is clearly modified; considerable changes to setting that affect the character of the asset</td>
</tr>
<tr>
<td>Slight</td>
<td>Changes to key archaeological materials, such that the asset is slightly altered; slight changes to setting</td>
</tr>
<tr>
<td>Negligible</td>
<td>Very minor changes to archaeological material or setting</td>
</tr>
<tr>
<td>No Impact</td>
<td>No change</td>
</tr>
</tbody>
</table>

#### 7.2.13

The following matrix is taken from the DMRB and is used to determine the level of significance of potential impact on the value of heritage assets. The significance of effects is a combination of the value of the resource or asset and the magnitude of impact on that resource or asset. Effects can be adverse or beneficial. Beneficial effects are those that mitigate existing impacts and help to restore or enhance heritage assets, therefore allowing for greater understanding and appreciation. The following matrix is used for assessment of effects on archaeological remains.

### Table 7.3 Measurement of effects matrix

<table>
<thead>
<tr>
<th>Asset Significance</th>
<th>No change</th>
<th>Negligible</th>
<th>Minor</th>
<th>Moderate</th>
<th>Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very high</td>
<td>Neutral</td>
<td>Slight</td>
<td>Moderate/ large</td>
<td>Large or very large</td>
<td>Very large</td>
</tr>
<tr>
<td>High</td>
<td>Neutral</td>
<td>Slight</td>
<td>Moderate/ slight</td>
<td>Moderate/ large</td>
<td>Large/ very large</td>
</tr>
<tr>
<td>Medium</td>
<td>Neutral /slight</td>
<td>Slight</td>
<td>Moderate</td>
<td>Moderate/ large</td>
<td>Moderate/ large</td>
</tr>
<tr>
<td>Low</td>
<td>Neutral /slight</td>
<td>Neutral /slight</td>
<td>Neutral /slight</td>
<td>Slight</td>
<td>Slight/ moderate</td>
</tr>
<tr>
<td>Negligible</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral /slight</td>
<td>Neutral /slight</td>
<td>Slight</td>
</tr>
</tbody>
</table>

**Geographical Scope**

#### 7.2.14

The geographical scope of this report focused upon the Study Area which comprised the GLHER search of 500m.

**Assumptions and Limitations**

#### 7.2.15

The baseline assessment relies on the accuracy of the data provided by the sources described above. There is always some degree of uncertainty in relation to these sources which include:
7.3 Baseline Conditions

7.3.1 The Desk Based Assessment (Appendix 7.1) should be consulted directly for detailed information and references regarding the existing archaeological and historical background of the Study Area. However, summary is contained below.

7.3.2 The area to the northwest of The Site is contained within an Archaeological Priority Zone. This is associated with a number of listed buildings circling the White Hart Lane and High Road Junction. At the eastern boundary of the Project Site, between the stadium car park and the High Road are four historic buildings: Warmington House 744 High Road, which is statutorily listed at Grade II and three locally listed buildings; 746, 748 and 750 High Road all of which are included on Haringey Council’s Register of Local Listed Buildings of Merit. At the northwest corner of The Site is the historic terrace known as the Northern Terrace. The latter comprises Nos.794-810 High Road, all of which are statutorily listed at Grade II except No. 796 Percy House and 808-810 High Road which are listed at Grade II* (790 (Dial House) Grade II* and 792 High Road also form part of the terrace but are not part of the Project Site).

7.3.3 No buried remains or potential remains have been identified that would require preservation in situ.

Prehistoric 250,000BC-AD50

7.3.4 The Study Area lies in the Lower Lea Valley, an area of recognised Prehistoric activity. There are however no GLHER entries from the Palaeolithic, Mesolithic, Neolithic periods nor the Bronze and Iron Age periods within the search area.

7.3.5 Prehistoric sites in the wider area include a site excavated along Glover Drive, 1.2km to the northeast of the proposed Project area and a Neolithic/early Bronze Age field system recorded approximately 230m north of the study site.

7.3.6 The lack of Prehistoric evidence in the immediate area may be a result of extensive Post Medieval development and a lack of archaeological recording in the area. It is unlikely to represent zero activity during the Prehistoric period, as prehistoric activity is common in the lower Lea Valley. The potential for
uncovering Prehistoric archaeological remains should, however, be considered low as the extent of existing development in the area is likely to have negatively impacted on any such archaeology.

**Roman AD50 – AD450**

7.3.7 The Study Area is located on the Tottenham High Road, which is the suspected route of the Roman Ermine Street, a major Roman route way leading out of the city.

7.3.8 There is one GLHER entry from the Roman period, 270m north of the study site, referring to a six metre wide gravel bank bound by small ditches that may constitute part of the Roman Ermine Street. It should however be noted that there was no obviously datable material within the feature, making its Roman provenance questionable.

7.3.9 The nearest known Roman Settlement is located along the suspected line of Ermine Street at Enfield, approximately 4.5km north of Tottenham.

7.3.10 Though there has been a lack of Roman archaeology excavated in the Study Area, it is likely that there was some activity along the High Road during the Roman Period. The potential for Roman buried remains should therefore be considered moderate/low.

**Early Medieval and Medieval AD450-AD1450**

7.3.11 The earliest settlement at Tottenham is thought to date from AD 894, when invading Danes sailed up the River Lea.

7.3.12 The Domesday Book indicates that Tottenham was predominantly meadowland, ploughland and forest in 1086. This was confirmed during recent excavations at Moselle Place, approximately 130m to the south-west of the study site, where compacted Medieval plough soil was encountered.

7.3.13 The Site is located on land which was owned by the Bruce family in 1254. The land was then granted to Richard Spigurnel in 1335, and was renamed Mocking Manor in 1427. The manor house was located directly south of the site, along Park Lane, formerly Marsh Lane.

7.3.14 Early development of a village in Tottenham took the form of small developing farmsteads lining the High Road. Evidence for this comes from an archaeological excavation 50m west of the study site that uncovered early Medieval plough soils cut by a substantial Post Medieval farm house.

7.3.15 Late Medieval development in Tottenham reflected the importance of the High Road as one of the main routes out of London to the north. Six inns were recorded along the Tottenham High Road between 1455 and 1456. The remains of three of these inns are recorded in the GLHER and line the northeast of The Site.

7.3.16 The Project Site is located in the area of the Medieval village of Tottenham. It is likely that any construction during this period would have taken place along the High Road – any buried archaeology associated with this should therefore be limited to the western edge of the site. There is a possibility that buried Medieval ploughsoil could survive in the eastern part of the site. The overall potential for this period is moderate.
Post Medieval to Modern AD1450-Present

7.3.17 The area of Tottenham developed steadily throughout the Post Medieval period with initial emphasis on the eastern side of the High Road in the 16th, 17th and 18th centuries spreading to the west by the 19th and 20th centuries.

7.3.18 The 1619 Dorset Survey shows a building present in the northeast area of the site, named Ridley House. This was formerly called the Black House and said to have been an inn frequented by Henry VIII. Four new buildings constructed in 1840, constituting the Northumberland Row, presently occupy the Ridley House site. It is thought that these buildings incorporate building materials from the old mansion. These are all Grade II* listed buildings.

7.3.19 There is a marked transition in the 18th century along the eastern side of the High Road from larger farmhouses with estates to smaller houses with individual gardens. This process is apparent along the western edge of the Project Site, with smaller plots of likely woodland occupying the eastern limits.

7.3.20 The remaining listed buildings in the Study Area relate to this transition. A pair of grade II* 18th century terraced houses lie to the north along the High Road, adjacent to The Site and are visible on the 1798 Wyburd Survey map. There are two early 19th century Grade II listed buildings on High Road within The Site.

7.3.21 It is likely that there were further early Post Medieval terraced houses occupying The Site to the south and the foundations of these developments are likely to survive. Excavations at Moselle Place identified Post Medieval building foundations cutting through the Medieval plough soil mentioned above.

7.3.22 The 1798 Wyburd Survey shows what is presumed to be part of the Tottenham Nursery occupying some 60 acres and owned by the Coleman family. The Nursery expanded into the south-eastern corner of the study site in the 19th century, when a number of structures were built.

7.3.23 Development on the Project Site since the 19th century includes the construction of further housing along Northumberland Road to the north, Worcester Avenue to the east, and along Paxton Road in the centre and south of the site. Housing on Paxton Road was demolished by 1935 to make space for a new Football Stadium.

7.3.24 The northern end of the Project Site was developed by 1935 when it was the location of a brewery and an industrial area.

7.3.25 The cartographic evidence from the site suggests that there is a high potential of buried Post Medieval archaeology along the western edge of the study site. There is a moderate potential for archaeology relating to the nursery in the southeast corner. The rest of the Project Site has a low potential for archaeological remains from this period.

7.3.26 Two phases of archaeological evaluation undertaken by L – P : Archaeology found that no archaeological remains existed within any of the trenches and that the only remains pre-dating the present development were of 20th origin.
7.4 Inherent Design Mitigation

7.4.1 The Project does not incorporate any mitigation by design. Previous archaeological evaluation of the site has determined that little or no archaeological deposits remain on the site and if present they would be of local significance. The remaining untested area for archaeological potential remains on the west of the site beneath and to the rear of the buildings that front onto the High Road. A watching brief as a mitigation would be prudent in this area and would thus be preservation by record.

7.5 Potential Environmental Impacts and Effects

7.5.1 All archaeological impacts will take place in the construction phase. All Impacts will be major and permanent, as a consequence there will be no operational effects.

7.5.2 The impacts of construction on underlying archaeology have been assessed using drawings supplied by Buro Happold (GESK-009) (Appendix 7.4) and by Populous (POP-4494-PLN-GA-0120) (Appendix 1.1).

7.5.3 The initial part of the construction process is remediation, this will involve stripping The Site to between 11 and 12m AOD which will remove the majority of the made ground. In most cases "made ground" should be seen to possess archaeological value as it is indicative or human rather than geological interaction with the ground. The basement area is to be reduce between 6.8 and 7.5m AOD, in some cases this will be into the London Clay but the majority will be within the River Terrace Gravels. After the remedial works the site will be cut/filled to produce a level base for general construction. A simplified figure showing remediation cut and fills is shown in Appendix 7.5.

7.5.4 For the purpose of this assessment the Project Site has been divided into six areas (A-F), determined by this remediation process (Appendix 7.5).

7.5.5 In addition to the remediation process, further associated groundworks may impact any buried archaeology. These works include piling, service trenches and foundation trenches. Piles are anticipated to be two diameters; 600mm and 900mm CFA piles with a depth of c.25m below installation level.

Area A

7.5.6 Area A is located in the area which will form the northern half of the main stadium arena and measures c.1.80ha.

7.5.7 After stripping, the majority of the area will be cut to a depth, of between 6.8 and 7.3m AOD with a shallower cutting of 10.5m AOD in the southwest corner.

7.5.8 The stadium will be constructed in the most part from reinforced concrete and piles ranging in diameters from 0.6-0.9m and 15m-20m in length. Groundworks associated with the construction are assumed to occupy the majority of Area A.

7.5.9 Evaluation trenches in this area indicated that no surviving archaeological deposits remained. The GLHER suggests that a Post Medieval house (774 High Road) briefly existed in the west of Area A. The northwest corner of Area A lies within a designated Archaeological Priority Zone.

7.5.10 The baseline data suggests that any archaeology that remains within Area A would have a value of low.
Construction phase groundworks across Area A will have a major impact on underlying archaeology that may remain – particularly on any surviving Post Medieval foundations along the western edge. The significance of the effect of construction in Area A will therefore be slight/moderate.

**Area B**

Area B considers land presently occupied by the northern half of White Hart Lane Stadium and land to the north of Paxton Way. The new pitch and southern half of the new football stadium is planned to be constructed here.

The remediation process and subsequent levelling in this area will not impact ground below the strip level. Plant tracking across the stripped land will impact any archaeology surviving immediately below the strip.

The stadium in this area will again be constructed in the most part from reinforced concrete and will require piles in diameters ranging from 0.6-0.9m in diameter and reaching a depth of 25m. Groundworks associated with the construction are also assumed to occupy the majority of Area B, given its location in the footprint of the stadium.

Baseline data suggests no potential for archaeology remaining under the existing stadium development. Archaeological evaluation trenches in the southwest of Area B yielded no archaeological deposits. The GLHER suggests that there is potential for archaeology relating to remains of early 19th century buildings fronting on to the High Road. The baseline data suggests that any archaeology that remains within Area B would have a value of low significance.

The planned remediation is likely have a moderate effect on the archaeology. However, the impact caused by the footprint of the foundation groundworks will have major impact upon the archaeology. The significance of the effect of construction in Area B will therefore be a slight/moderate.

**Area C**

Area C lies in the southern most section of the planned Project site and measures c.0.5ha. This is subject to an outline planning application. It is currently occupied by the southeast corner and southern stand of the existing Stadium. Planned building in this area includes the construction of residential towers, podium and part of the Extreme Sports Centre. This area will have abasement, though currently a pile design and excavation have not been issued. Given the height of the proposed buildings, pile foundations will be deep in nature.

The Desk Based Assessment (see Appendix 7.1) indicated possible surviving Medieval plough soil; it also seems likely that Tottenham Nurseries expanded across into this area with what appear to be ornamental gardens in the 1864 Ordnance Survey. Archaeology of this nature would have a low significance.

This area of the site has already been significantly impacted through the construction of the existing Stadium. The planned remediation is likely have a moderate effect on the archaeology. However, the impact caused by the footprint of the foundation groundworks will have a major impact. The significance of the effect of construction in Area C will therefore be a slight/moderate.

**Area D**

Area D covers land falling on the edge of The Site that includes High Road in the west, Park Lane in the
south and Worcester Avenue in the east and pedestrian areas around the Project. It measures c. 2.6ha. No deep foundational groundworks are required in this area although land within the footprint of any landscaping is likely to be stripped and filled.

7.5.21 An early 19th century listed building (Warmington House) presently stands in Area D between the new stadium and the High Road. It is likely that foundations of similar and/or earlier constructions may underlay present structures fronting the High Road. It should also be noted that remains of Roman Ermine Street may be present in this area. Warmington House is planned for refurbishment and extension although no designs have yet been issued. Archaeology relating to the above would be of low significance.

7.5.22 The planned remediation is unlikely to disturb archaeology in Area D. However, the impact of the extension to Warmington House is likely to be moderate/major impact. The significance of the effect of construction in Area D will therefore be a slight/moderate.

**Area E**

7.5.23 Area E designates land that falls between the new stadium Project and Area C. This area is not expected to be piled and will form a car park with an entry from Worcester Avenue. It measures c.0.62ha.

7.5.24 Remediation will take place to a depth of 500mm, subsequent levelling is unlikely to disturb the ground further as the land will be filled rather than cut. Plant tracking across the stripped land will impact any archaeology surviving immediately below the strip.

7.5.25 This area will also be landscaped as part of the public realm area and will be subject to hard landscaping, no intrusive groundworks will be required in this area.

7.5.26 Baseline data indicates a potential for Medieval ploughsoil, and the possibility that Tottenham Nurseries expanded south into this area with what appear to be ornamental gardens in the 1864 Ordnance Survey. The baseline data suggests that archaeological deposits in area E would be of low significance.

7.5.27 The planned remediation and groundworks suggests the impact of development will cause a major impact to underlying archaeology. It should further be noted that the preservation of archaeology is presently assumed to be Area E due to the destruction caused by the present stadium. The significance of the effect of construction in Area E will therefore be slight/moderate.

**Area F**

7.5.28 Area F consists of land in the northwest of the Project site. The land surrounding and beneath the listed and surviving buildings within this area have the potential to yield earlier constructions that may have fronted out onto the High Road. The Roman Road of Ermine Street makes up the western boundary of Area F. Area F is also situated within an Archaeological Priority Area. Baseline data suggests that archaeology within this Area will be of medium significance.

7.5.29 The buildings in this area are set to be retained and the impact upon archaeological deposits will be negligible, as such there is likely to be neutral impact on archaeological deposits in this area.

**Construction**

7.5.30 It has been demonstrated that archaeological deposits on the site have already been truncated by prior
development. Any remaining archaeological deposits such as buried soil horizons would be physically impacted by any groundworks or landscaping and impacts would be irreversible.

7.6 Additional Mitigation, Compensation and Enhancement Measures

7.6.1 A watching brief (WB) on groundworks in the west of the site, to the rear of the buildings on High Road and in the western part of the site is recommended as a means of preservation by record. This would thereby further reduce the impact upon the significance of the archaeology.

7.7 Assessment Summary and Residual Environmental Impacts and Effects

Construction

7.7.1 The construction phase would involve ground disturbance including the excavation of foundations, piling and service trenches, landscaping and temporary works. This would have a major and irreversible effect on buried archaeological remains within the Site. The buried remains are likely to comprise Post Medieval finds and/or features of low significance. The magnitude of the impact is considered major, and therefore the significance of effect is assessed to be slight/moderate.

7.7.2 However, by undertaking a watching brief in Areas A, B and D the overall final impact would be reduced from major to minor and the final magnitude of the effect of construction in these area is neutral/slight.

Operation

7.7.3 The nature of this development suggests that after completion, there will be no operational effects to the buried archaeology, assuming the appropriate mitigation strategies are employed.

7.7.4 A summary of residual environmental impacts and effects are summarised in Table 7.4 bellow.
### Table 7.4: Archaeology Assessment Summary

<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance of Effect</th>
<th>Additional Mitigation</th>
<th>Residual Impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Remediation – stripping ground for whole site to 500mm</td>
<td>Major</td>
<td>Slight/Mode rate</td>
<td>None</td>
<td>Slight/moderate</td>
<td>Slight/moderate</td>
</tr>
<tr>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Cutting of Area A to c.6.8m AOD</td>
<td>Major</td>
<td>Slight/Mode rate</td>
<td>WB in west of Area A</td>
<td>Minor</td>
<td>Neutral/ slight</td>
</tr>
<tr>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Foundational groundworks, Area B</td>
<td>Major</td>
<td>Slight/Mode rate</td>
<td>WB in west of area B</td>
<td>Minor</td>
<td>Neutral/ slight</td>
</tr>
<tr>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Foundational groundworks, Area C</td>
<td>Moderate/Major</td>
<td>Slight/Mode rate</td>
<td>None</td>
<td>Slight/moderate</td>
<td>Slight/moderate</td>
</tr>
<tr>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Stripping and landscaping works in Area D</td>
<td>Major</td>
<td>Slight/Mode rate</td>
<td>WB in west of area D</td>
<td>Minor</td>
<td>Neutral/ slight</td>
</tr>
<tr>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Hard landscaping groundworks in Area E</td>
<td>Major</td>
<td>Slight/Mode rate</td>
<td>None</td>
<td>Slight/moderate</td>
<td>Slight/moderate</td>
</tr>
<tr>
<td>Potential buried archaeological deposits</td>
<td>Medium</td>
<td>No planned impact upon buried deposits in Area F</td>
<td>Negligible</td>
<td>Neutral</td>
<td>None if no instructive works take place</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td><strong>Operational Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Operational Effect Predicated</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
8. Cultural Heritage

8.1 Introduction

8.1.1 This chapter of the ES has been produced by Donald Insall Associates and identifies the features of cultural heritage importance that would be affected by the Project and assesses the potential effects of the Project on these cultural assets. This assessment covered above ground cultural heritage only, with archaeology assessed within a separate chapter of the EIA.

8.1.2 The Project Site is shown by a red line site boundary on the map at Appendix 1 of Appendix 8.2. The football stadium stands at the southern end of the site immediately abutting Park Lane, Worcester Avenue and Paxton Road, the latter running east to west across the Project Site. The stadium is adjoined to the west by a large car park and smaller low-quality temporary buildings associated with the football ground. At the eastern boundary of the application site, between the stadium car park and the High Road are four historic buildings: Warlington House 744 High Road, which is statutorily listed at Grade II and three locally listed buildings; 746, 748 and 750 High Road all of which are included on Haringey Council’s Register of Local Listed Buildings of Merit. At the north-western corner of the Project Site is the historic terrace known as the Northern Terrace. The latter comprises Nos.794-810 High Road, all of which are statutorily listed at Grade II except No. 796 Percy House and 808-810 High Road which are listed at Grade II* (790 (Dial House) Grade II* and 792 High Road also form part of the terrace but are not part of the Project Site). A separate planning and listed building consent application (Ref HGY/2015/1488 and HGY/2015/1490) has been approved by Haringey Council in August 2015 for the conversion and reuse of Percy House, listed at Grade II*, by the Tottenham Hotspur Foundation, and a separate application will soon be submitted for the conversion and reuse of 810 High Road, also Grade II*, as a café and art gallery. The western edge of the Project Site is located within the North Tottenham Conservation Area, one of six designated conservation areas which make up the Tottenham High Road Historic Corridor.

8.1.3 Outside the boundary of the Project Site there are a number of nearby statutorily listed buildings that are included in the North Tottenham Conservation Area. These are identified on a map produced as part of a Conservation Management Plan for North Tottenham by Donald Insall Associates in 2014. The map is included at Appendix 1 of Appendix 8.2. The map does not cover the whole of the conservation area, instead showing the listed buildings within the environs of the Project Site along White Hart Lane and along the High Road up to the junction with Ruskin Road. The listed buildings in the North Tottenham Conservation Area and within the wider environs of the Project Site comprise Numbers 797, 799, 816-818, 819-821, 820, 822, 867-869 High Road (Grade II) to the north of the Project Site and Numbers 662, 664-666, 670 & 676 (Gate Building Whitbread Brewery) 668-668a, 707 High Road (Grade II) to the south of the site. Along White Hart Lane to the north-west of the Project Site are Numbers 7, The Grange, and 32, 34 & 34a White Hart Lane that are also listed at Grade II.

8.1.4 There are other buildings outside the red line boundary of the Project Site and within the environs of the site in the North Tottenham Conservation Area that are non-designated heritage assets, some being locally listed. These are also shown on the map at Appendix 1 of Appendix 8.2 and are listed in Appendix 8.1.

8.1.5 The focus of this assessment lies on the North Tottenham Conservation Area and its associated heritage assets as this forms part of the immediate environs of the site. However, as the Project includes a
number of tall buildings, the impact of the Project on longer views from the Scotland Green, Bruce Grove, Bruce Castle, Tottenham Cemetery and Tottenham Green Conservation Areas is also assessed in this Chapter in addition to the impact on the very long-distance view from Alexandra Palace to the west.

8.2 Assessment Criteria and Methodology

Previous Assessment

8.2.1 In May 2010 Tottenham Hotspur Property Company Ltd on behalf of Tottenham Hotspur Football Club (collectively known as the Club), submitted a planning application for a new football stadium (designed by KSS Architects) at White Hart Lane together with enabling development comprising retail, housing and a hotel (application reference HGY/2010/1000). The project is known as the Northumberland Development Project (NDP). In 2011, the Club secured planning permission for the application.

8.2.2 In December 2011, the Club submitted two separate further applications for planning permission which required addendums to the May 2010 ES. The addendums dealt with Phase 1 the Northern Development (planning application reference HGY/2011/2350, and Addendum No.1) and Phase 3 the Southern Development (planning application reference HGY/2011/2351 and Addendum No. 2). Planning Permission for the revised Southern and Northern applications was granted in March 2012. The Northern Development has since been completed.

8.2.3 Regarding the Southern Development, the outline consent reserved detailed matters relating to design and scale for approval at a later stage. A reserved matters application was submitted (20th March 2015). Further to this, a minor material amendment application was made under Section 73 in July 2015 for alterations to the proposed basement of the Stadium.

Scoping Opinion

8.2.4 The Scoping Report for this Cultural Heritage chapter was completed in May 2015. It sets out the primary objectives of the Cultural Heritage chapter which were summarised as follows:

- Identify designated heritage assets and undesignated heritage assets within the Project Site and in the wider study area;
- Assess the value (significance) of the recorded and potential heritage assets within the project site and in the wider study area;
- Identify appropriate mitigation measures; and
- Identify the potential impacts upon the identified heritage assets within the assessment area and the significance of the effects of the proposals on the heritage assets and their setting.

8.2.5 The Scoping Report also set out the legislation and policy, assessment methodology, geographical scope, an overview of the baseline conditions, construction methodology, operational methodology and the assessment criteria all of which are set out and explained further in this chapter.

8.2.6 Since the completion of the Scoping Report the extent of the study area and scope of the assessment has expanded beyond the North Tottenham Conservation Area to include an assessment of the impact on longer views from the following designated heritage assets:

- Scotland Green Conservation Area;
Bruce Grove Conservation Area;
Bruce Castle Conservation Area;
Tottenham Cemetery Conservation Area;
Tottenham Green Conservation Area and;
Alexandra Palace and its setting which is separately listed as a Registered Park and Garden.

8.2.7 Although a formal Scoping Opinion was not sought the Scope of the EIA was based on the technical scope for the original 2010 ES and the Southern Addendum. A draft Scoping Report was sent to the Council on the 19th June 2015, for their informal comments and discussion. No informal comments were received in relation to the Heritage draft Scope.

Legislative Context

8.2.8 The background to the assessment of the ‘heritage value’ of buildings and sites has its roots in the work of UNESCO which led to the establishment of the International Council on Monuments and Sites (ICOMOS) (Moscow 1978) and latterly the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (The Burra Charter) 1999. The Burra Charter 2013 and seven new Practice Notes were adopted by Australia ICOMOS in 2013 following a detailed program of review, drafting and consultation that started in 2009. Article 1 of the Charter defines “cultural significance” as “aesthetic, historic, scientific or social value for past, present or future generations”. Cultural significance is "embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects.” Place itself means “means a geographically defined area. It may include elements, objects, spaces and views. Place may have tangible and intangible dimensions.”

8.2.9 The Planning (Listed Buildings and Conservation Areas) Act 1990 is the legislative basis for decision making on applications that relate to the historic environment. Sections 66 and 72 of the Act impose a statutory duty upon local planning authorities to consider the impact of proposals upon listed buildings and conservation areas.

8.2.10 Section 66 of the Planning (Listed Buildings and Conservation Areas) Act 1990 states that ‘in considering whether to grant permission for development which affects a listed building or its setting, the local planning authority, or as the case may be the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.’

8.2.11 Similarly, Section 72(I) states that ‘… with respect to any buildings or other land in a conservation area, special attention shall be paid to the desirability of preserving or enhancing the character or appearance of a conservation area.’

8.2.12 The failure to preserve, i.e. any harm caused to the heritage assets, can however be outweighed by public benefits, depending on the level of harm caused. Harm can in some cases also be outweighed by other substantial material considerations if they are powerful enough to justify the harm caused.

8.2.13 The Barnwell Manor and Forge Field judgements provided detailed consideration of the overarching statutory duty imposed by the Planning (Listed Buildings and Conservation Areas) Act 1990 to preserve the setting of listed buildings and to preserve or enhance the character or appearance of conservation areas. Should it be considered that the proposals would result in harm, and therefore engage the strong presumption referred to in the Barnwell Manor and Forge Field cases against the grant of planning
permission, considerable importance and weight must be accorded to this harm. In relation to the strength
of the presumption, as stated at paragraph 28 of the judgement of Sullivan LJ on the Barnwell Manor
Decision:

8.2.14 ‘If the harm to the setting of a Grade I listed building would be less than substantial that will plainly lessen
the strength of the presumption against the grant of planning permission (so that the grant of planning
permission would no longer have to be ‘wholly exceptional’), but it does not follow that the ‘strong
presumption’ against the grant of planning permission has been entirely removed.’

8.2.15 In the Forge Field case the judgement of Lindblom, J. stated of the presumption against the grant of
planning permission that:

8.2.16 ‘It can be outweighed by material considerations powerful enough to do so. But an authority can only
properly strike a balance between harm to a heritage asset on the one hand and planning benefits on the
other if it is conscious of the statutory presumption in favour of preservation and if it demonstrably applies
that presumption to the proposal it is considering.’

Planning Policy and Guidance

National Planning Policy Framework

8.2.17 The NPPF sets out the Government’s planning policies for England and how these are expected to be
applied. Central to the NPPF ‘is a presumption in favour of sustainable development’ (paragraph 14). With regard to ‘Conserving and enhancing the historic environment’, the framework requires proposals
relating to heritage assets to be justified and an explanation of their effect on the heritage asset’s
significance provided. Heritage assets are defined in the NPPF glossary as ‘a building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning
decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets
identified by the local planning authority (including local listing)’ while significance is defined in the
glossary as ‘the value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a
heritage asset’s physical presence, but also from its setting’. With regard to the significance of a heritage
asset and the implementation of proposals, the framework contains the following policy: ‘local planning
authorities should identify and assess the particular significance of any heritage asset that may be
affected by a proposal taking account of the available evidence and any necessary expertise. They
should take this assessment into account when considering the impact of a proposal on a heritage asset,
to avoid or minimise conflict between the heritage asset’s conservation and any aspect of the proposal’
(paragraph 29).

8.2.18 In determining applications local planning authorities are required to take account of significance, viability,
sustainability and local character and distinctiveness. Paragraph 131 of the NPPF identifies the following
criteria in relation to this:

- the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable
  uses consistent with their conservation;
- the positive contribution that conservation of heritage assets can make to sustainable communities
  including their economic vitality; and
- the desirability of new development making a positive contribution to local character and distinctiveness.’
8.2.19 With regard to potential ‘harm’ to the significance of a designated heritage asset, paragraph 132 the framework states the following: ‘…great weight should be given to the asset’s conservation. The more important the asset, the greater the weight should be. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. As heritage assets are irreplaceable, any harm or loss should require clear and convincing justification.’

8.2.20 With regard to ‘less than substantial harm’ to the significance of a designated heritage asset, of the NPPF states the following: ‘where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal, including securing its optimum viable use’ (paragraph 134).

8.2.21 In relation to the consideration of applications for development affecting the setting of a designated heritage asset, paragraph 137 of the document states the following: ‘proposals that preserve those elements of the setting that make a positive contribution to or better reveal the significance of the asset should be treated favourably’.

8.2.22 In terms of non-designated heritage assets, the NPPF states: ‘the effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that affect directly or indirectly non designated heritage assets, a balance judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset’ (paragraph 135).

8.2.23 With regard to the loss of a building (or other element) which makes a positive contribution to a Conservation Area, paragraph 138 states this should be treated: ‘…As substantial harm under paragraph 133 or less than substantial harm under paragraph 134, as appropriate, taking into account the relative significance of the element affected and its contribution to the significance of the Conservation Area…as a whole.’

**Local Planning Policy**

8.2.24 Haringey's development plan for the borough is made up of the London Plan (2015), the Local Plan: Strategic Policies (2013) and the Saved UDP Policies.

8.2.25 On 10 March 2015, the Mayor published (i.e. adopted) the Further Alterations to the London Plan (FALP). From this date, the FALP are operative as formal alterations to the London Plan (the Mayor’s spatial development strategy) and form part of the development plan for Greater London. The London Plan contains policies that would both affect directly and indirectly the historic environment and development of locations such as this.

8.2.26 Policy 7.8 of the Plan ‘Heritage Assets and Archaeology’ notes that London’s heritage assets and historic environment should be identified, so that ‘the desirability of sustaining and enhancing their significance and of utilising their positive role in place shaping can be taken into account’.

8.2.27 In terms of development the Policy states that ‘development should identify, value, conserve, restore, re-use and incorporate heritage assets, where appropriate’ and ‘development affecting heritage assets and their settings should conserve their significance, by being sympathetic to their form, scale, materials and architectural detail’.
8.2.28 Policy 7.9 relates to ‘Heritage-Led Regeneration’ and notes that ‘regeneration schemes should identify and make use of heritage assets and reinforce the qualities that make them significant so they can help stimulate environmental, economic and community regeneration’.

8.2.29 The Policy goes on to explain that heritage assets, including buildings at risk, wherever possible ‘should be repaired, restored and put to a suitable and viable use that is consistent with their conservation and the establishment and maintenance of sustainable communities and economic vitality’.

8.2.30 Haringey’s Local Plan Strategic Policies were adopted in March 2013 and run until 2026. Policy SP12 relates to the conservation of the borough and states Haringey’s commitment to the ensuring ‘the conservation of the historic significance of Haringey’s heritage assets, their setting, and the wider historic environment. The Policy also notes that ‘the Historic Environment should be used as the basis for heritage-led regeneration and as the basis for good design and positive change’.

8.2.31 Policy SP12 notes the following about the Tottenham High Road Historic Corridor which runs north to south through the borough, and part of which forms the study site: ‘The Tottenham High Road Historic Corridor covers an extensive area, stretching approximately 3.7km between Enfield to the north and Stamford Hill to the south. Accordingly, it is relatively diverse in character and appearance and is subdivided into six Conservation Areas, each with unifying characteristics such as scale, massing, use, architectural style and detailing and period of development. Tottenham High Road Historic Corridor is centred upon the High Road; a wide, busy road which is fronted almost continuously by terraces of three or four storeys, with commercial uses at ground floor. However, interspersed within the frontage are a number of larger civic, educational and religious buildings. There are also a number of open spaces along the length of the High Road, at Scotland Green, Tottenham Green and Seven Sisters/Page Green. The residential roads flanking the High Road are characterised by more finely grained terraces of two and, occasionally three storeys with a greater degree of uniformity in materials and architectural detailing. The character of the High Road and its restaurants, cafes, retailing and commercial outlets reflects its diverse ethnic mix. The eastern part of the borough is where most of Haringey’s future growth will take place. Where this growth is adjacent to the Tottenham High Road Historic Corridor, the Council will seek to ensure that future development takes into account its sensitive context and maximises opportunities and benefits for the local area as a whole.’

8.2.32 Haringey’s Unitary Development Plan was adopted July 2006. The plan has since been superseded but a number of policies have been saved as ‘Saved Policies: March 2013’. The following three saved policies are of relevance to the proposals which seek to demolish three locally listed buildings in a conservation area, construct new buildings and restore and make alterations to a listed building.

8.2.33 Policies CSV4 and CSV5 relate to alterations and extensions to listed buildings and conservation areas respectively. Policy CSV4 requires that alterations or extensions to listed buildings are necessary, relate sensitively to the building and do not adversely affect its setting. Alterations and extensions to conservation areas are required to ‘preserve or enhance’ the character of the conservation area and retain or reinstate characteristic features. With regard to demolition in conservation areas, Policy CSV7 states that the council will seek to protect buildings in conservation areas by refusing applications for their demolition if it would have an adverse impact on the character and appearance of the conservation area. This policy also states that the council may consider demolition acceptable if it would result in substantial community benefit.
Planning Practice Guidance / Best Practice

8.2.34 There are two main forms of guidance which are used in the assessment of the historic environment: the National Planning Practice Guidance (2014) and the Historic England: Historic Environment Good Practice Advice in Planning (March 2015). Historic England’s document ‘Seeing History in the View’ (May 2011) also provides additional guidance and a method for assessing heritage significance within views.

National Planning Practice Guidance

8.2.35 The National Planning Practice Guidance was published on the 6th March 2014 to support the National Planning Policy Framework and the planning system. It includes particular guidance on matters relating to protecting the historic environment in the section: Conserving and Enhancing the Historic Environment. The relevant guidance is as follows:

8.2.36 Paragraph 3 of the guidance provides the following information on heritage assets and conservation: “Heritage assets are an irreplaceable resource and effective conservation delivers wider social, cultural, economic and environmental benefits’ whilst ‘conservation is an active process of maintenance and managing change. Ensuring such heritage assets remain used and valued is likely to require sympathetic changes to be made from time to time.”

8.2.37 Paragraph 7 states: 'There are three dimensions to sustainable development: economic, social and environmental. These dimensions give rise to the need for the planning system to perform a number of roles:

- An economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;
- A social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community’s needs and support its health, social and cultural well-being; and
- An environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.'

8.2.38 Paragraph 8 of the guidance sets out what “significance” is:

‘Significance” in terms of heritage policy is defined in the Glossary of the National Planning Policy Framework. In legislation and designation criteria, the terms ‘special architectural or historic interest’ of a listed building and the ‘national importance’ of a scheduled monument are used to describe all or part of the identified heritage asset’s significance. Some of the more recent designation records are more helpful as they contain a fuller, although not exhaustive, explanation of the significance of the asset.’

8.2.39 Paragraph 9 sets out why is 'significance' important in decision-taking:

‘Heritage assets may be affected by direct physical change or by change in their setting. Being able to properly assess the nature, extent and importance of the significance of a heritage asset, and the
8.2.40 Paragraph 13 sets out the setting of a heritage asset and how should it be taken into account:

‘The “setting of a heritage asset” is defined in the Glossary of the National Planning Policy Framework. A thorough assessment of the impact on setting needs to take into account, and be proportionate to, the significance of the heritage asset under consideration and the degree to which proposed changes enhance or detract from that significance and the ability to appreciate it. Setting is the surroundings in which an asset is experienced, and may therefore be more extensive than its curtilage. All heritage assets have a setting, irrespective of the form in which they survive and whether they are designated or not. The extent and importance of setting is often expressed by reference to visual considerations. Although views of or from an asset will play an important part, the way in which we experience an asset in its setting is also influenced by other environmental factors such as noise, dust and vibration from other land uses in the vicinity, and by our understanding of the historic relationship between places. For example, buildings that are in close proximity but are not visible from each other may have a historic or aesthetic connection that amplifies the experience of the significance of each. The contribution that setting makes to the significance of the heritage asset does not depend on there being public rights or an ability to access or experience that setting. This will vary over time and according to circumstance. When assessing any application for development which may affect the setting of a heritage asset, local planning authorities may need to consider the implications of cumulative change. They may also need to consider the fact that developments which materially detract from the asset’s significance may also damage its economic viability now, or in the future, thereby threatening its ongoing conservation.’

8.2.41 Paragraph 15 explains what is a viable use for a heritage asset and how it is taken into account in planning decisions.

‘Putting heritage assets to a viable use is likely to lead to the investment in their maintenance necessary for their long-term conservation. By their nature, some heritage assets have limited or even no economic end use. A scheduled monument in a rural area may preclude any use of the land other than as a pasture, whereas a listed building may potentially have a variety of alternative uses such as residential, commercial and leisure. In a small number of cases a heritage asset may be capable of active use in theory but be so important and sensitive to change that alterations to accommodate a viable use would lead to an unacceptable loss of significance. It is important that any use is viable, not just for the owner, but also the future conservation of the asset […] If there is only one viable use, that use is the optimum viable use. If there is a range of alternative viable uses, the optimum use is the one likely to cause the least harm to the significance of the asset, not just through necessary initial changes, but also as a result of subsequent wear and tear and likely future changes. The optimum viable use may not necessarily be the most profitable one. It might be the original use, but that may no longer be economically viable or even the most compatible with the long-term conservation of the asset […] Harmful development may sometimes be justified in the interests of realising the optimum viable use of an asset, notwithstanding the loss of significance caused provided the harm is minimised. The policy in addressing substantial and less than substantial harm is set out in paragraphs 132 – 134 of the National Planning Policy Framework.’

8.2.42 Paragraph 17 sets out how to assess if there is substantial harm:
What matters in assessing if a proposal causes substantial harm is the impact on the significance of the heritage asset. As the National Planning Policy Framework makes clear, significance derives not only from a heritage asset’s physical presence, but also from its setting. Whether a proposal causes substantial harm will be a judgment for the decision taker, having regard to the circumstances of the case and the policy in the National Planning Policy Framework. In general terms, substantial harm is a high test, so it may not arise in many cases. For example, in determining whether works to a listed building constitute substantial harm, an important consideration would be whether the adverse impact seriously affects a key element of its special architectural or historic interest. It is the degree of harm to the asset’s significance rather than the scale of the development that is to be assessed. The harm may arise from works to the asset or from development within its setting. While the impact of total destruction is obvious, partial destruction is likely to have a considerable impact but, depending on the circumstances, it may still be less than substantial harm or conceivably not harmful at all, for example, when removing later inappropriate additions to historic buildings which harm their significance. Similarly, works that are moderate or minor in scale are likely to cause less than substantial harm or no harm at all. However, even minor works have the potential to cause substantial harm. Policy on substantial harm to designated heritage assets is set out in paragraphs 132 and 133 to the National Planning Policy Framework.

8.2.43 Paragraph 18 discusses harm in relation to conservation areas:

‘An unlisted building that makes a positive contribution to a conservation area is individually of lesser importance than a listed building (paragraph 132 of the National Planning Policy Framework). If the building is important or integral to the character or appearance of the conservation area then its demolition is more likely to amount to substantial harm to the conservation area, engaging the tests in paragraph 133 of the National Planning Policy Framework. However, the justification for its demolition will still be proportionate to the relative significance of the building and its contribution to the significance of the conservation area as a whole.’

8.2.44 Paragraph 19 describes how proposals can avoid or minimise harm to the significance of a heritage asset:

‘A clear understanding of the significance of a heritage asset and its setting is necessary to develop proposals which avoid or minimise harm. Early appraisals, a conservation plan or targeted specialist investigation can help to identify constraints and opportunities arising from the asset at an early stage. Such studies can reveal alternative development options, for example more sensitive designs or different orientations, that will deliver public benefits in a more sustainable and appropriate way.’

8.2.45 Paragraph 20 defines what is meant by the term public benefits:

‘Public benefits may follow from many developments and could be anything that delivers economic, social or environmental progress as described in the National Planning Policy Framework (Paragraph 7). Public benefits should flow from the proposed development. They should be of a nature or scale to be of benefit to the public at large and should not just be a private benefit. However, benefits do not always have to be visible or accessible to the public in order to be genuine public benefits. Public benefits may include heritage benefits, such as: sustaining or enhancing the significance of a heritage asset and the contribution of its setting; reducing or removing risks to a heritage asset; and, securing the optimum viable use of a heritage asset.’
8.2.46 Paragraph 39 explains what non-designated heritage assets are and how they are important: ‘Local planning authorities may identify non-designated heritage assets. These are buildings, monuments, sites, places, areas or landscapes identified as having a degree of significance meriting consideration in planning decisions but which are not formally designated heritage assets. In some areas, local authorities identify some non-designated heritage assets as ‘locally listed’.’


8.2.48 The purpose of Historic England’s “Historic Environment Good Practice Advice in Planning” is to provide information on good practice to assist in implementing the historic environment policy in the National Planning Policy Framework (NPPF) and the related guidance given in the National Planning Practice Guide (NPPG). It is not policy in the way the NPPF is and is a ‘Good Practice Guide’ unlike the NPPG which offers guidance on the policies of the NPPF.

8.2.49 Note 2 ‘Managing Significance in Decision-Taking’ provides information on “assessing the significance of heritage assets, using appropriate expertise, historic environment records, recording and furthering understanding, neglect and unauthorised works, marketing and design and distinctiveness.”

8.2.50 It states that: “The advice in this document, in accordance with the NPPF, emphasises that the information required in support of applications for planning permission and listed building consent should be no more than is necessary to reach an informed decision, and that activities to conserve or investigate the asset needs to be proportionate to the significance of the heritage assets affected and the impact on that significance.”

8.2.51 In their general advice on decision-taking, this note advises that: “Development proposals that affect the historic environment are much more likely to gain the necessary permissions and create successful places if they are designed with the knowledge and understanding of the significance of the heritage assets they may affect. The first step for all applicants is to understand the significance of any affected heritage asset and, if relevant, the contribution of its setting to its significance. The significance of a heritage asset is the sum of its archaeological, architectural, historic, and artistic interest.”

8.2.52 Paragraph 6 highlights the NPPF and NPPG’s promotion of early engagement and pre-application discussion, and the early consideration of significance of the heritage asset in order to ensure that any issues can be properly identified and addressed. Furthermore, the note advises that:

“As part of this process, these discussions and subsequent applications usually benefit from a structured approach to the assembly and analysis of relevant information. The stages below indicate the order in which this process can be approached – it is good practice to check individual stages of this list but they may not be appropriate in all cases and the level of detail applied should be proportionate.

1. Understand the significance of the affected assets;
2. Understand the impact of the proposal on that significance;
3. Avoid, minimise and mitigate impact in a way that meets the objectives of the NPPF;
4. Look for opportunities to better reveal or enhance significance;
5. Justify any harmful impacts in terms of the sustainable development objective of conserving significance and the need for change;

6. Offset negative impacts on aspects of significance by enhancing others through recording, disseminating and archiving archaeological and historical interest of the important elements of the heritage assets affected.”

8.2.53 Paragraph 7 Emphasises the need to properly assess the nature, extent and importance of the significance of a heritage asset and the contribution of its setting early in the process, in order to form a successful development, and in order for the local planning authority to make decisions in line with legal objectives and the objectives of the development plan and the policy requirements of the NPPF.

8. Understanding the nature of the significance is important to understanding the need for and best means of conservation. For example, a modern building of high architectural interest will have quite different sensitivities from an archaeological site where the interest arises from the possibility of gaining new understanding of the past.

9. Understanding the extent of that significance is also important because this can, among other things, lead to a better understanding of how adaptable the asset may be and therefore improve viability and the prospects for long term conservation.

10. Understanding the level of significance is important as it provides the essential guide to how the policies should be applied. This is intrinsic to decision-taking where there is unavoidable conflict with other planning objectives.

11. To accord with the NPPF, an applicant will need to undertake an assessment of significance to inform the application process to an extent necessary to understand the potential impact (positive or negative) of the proposal and to a level of thoroughness proportionate to the relative importance of the asset whose fabric or setting is affected.

8.2.54 Note 3 ‘The Setting of Heritage Assets’ provides guidance on the setting of heritage assets, which is separate to issues of curtilage, character or context.

The Extent of Setting

“4. The setting of a heritage asset is the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset.

The setting of a heritage asset may reflect the character of the wider townscape or landscape in which it is situated, or be quite distinct from it. Extensive heritage assets can include many heritage assets and their nested and overlapping settings, as well as having a setting of their own. I.e. A conservation area will include the settings of listed buildings and have its own setting.”

Views and Setting

“5. The contribution to the setting of a heritage asset can be expressed through a wide variety of views.

6. Views which contribute more to understanding the significance of the heritage asset include:
Even if recent unsympathetic development has affected the setting or views of a heritage asset, consideration will still be given to whether developments would further detract or enhance the significance of the asset.

**Setting and the Significance of Heritage Assets**

9. Setting is not a heritage asset, nor a heritage designation, though land within a setting may itself be designated. Its importance lies in what it contributes to the significance of the heritage asset, which may vary from asset to asset. Therefore, implications of development affecting the setting of heritage assets should be considered on a case-by-case basis.

**Setting and urban design**

The numbers and proximity of heritage assets in urban areas mean that the protection and enhancement of setting is intimately linked to townscape and urban design considerations, and often relate to townscape attributes such as lighting, trees, and verges, or the treatments of boundaries or street surfaces.

**Setting and economic and social viability**

8.2.55 Sustainable development under the NPPF can have important positive impacts on heritage and their settings, for example by bringing an abandoned building back into use or giving a heritage asset further life. However, the economic and social viability of a heritage asset can be diminished if accessibility from or to its setting is reduced by badly designed or insensitively located development.

**A staged approach to proportionate decision-taking**

10. Protection of the setting of heritage assets need not prevent change; indeed change may be positive, for instance where the setting has been compromised by poor development.

**Historic England, Seeing History in the View (May 2011)**

8.2.56 Historic England’s Seeing History in the View provides guidance and a method for assessing heritage significance within views. The method is split into two phases:

- Phase A baseline analysis: defines and analyses heritage significance within a view; and
- Phase B assessment: assesses the potential impact of a specific development proposal on heritage significance within a view, as analysed in Phase A.

8.2.57 In order to analyses the heritage significance within a view as part of Phase A there are a number of steps:
Step 1: Establish reasons for identifying a particular view as important;
Step 2: Identify which heritage assets in the view merit consideration;
Step 3: Assess the significance of individual heritage assets;
Step 4: Assess the overall heritage significance in a view; and
Step 5: Explain how the heritage significance within the view can be sustained.

8.2.58 The process of the Phase B assessment is to assess the impact of a proposed development on heritage significance within a view. The method continues the step approach to completing this assessment:

Step 6: Identify the importance of the individual heritage assets and the view as a whole;
Step 7: Assess the magnitude of the impacts on individual heritage assets;
Step 8: Assess the magnitude of the cumulative impact of proposals on heritage;
Step 9: Determine the overall impact; and
Step 10: Identify ways of mitigating the impact of the development.

Assessment Methodology

8.2.59 The assessment of the significance of the cultural heritage assets within the study area accords with the relevant policies and guidance of the NPPF, NPPG and Historic England Guidance as set out in Section 8.3.12-8.3.49 of this chapter, and has been undertaken in two main stages:

1. Research into the historical and architectural significance of the buildings within the Project Site, and the wider study area, including the North Tottenham Conservation Area.

2. A site based visual survey of the fabric surviving on site and in the study area to verify the findings of the research and to assess the quality of the surviving fabric in situ and its architectural significance.

8.2.60 The research has included the assessment of documentary and cartographic records collated from the following sources:

- Bruce Castle Museum (Haringey Culture, Libraries and Learning) for written records, historic photographs and maps;
- The National Monuments Record, Swindon for historic aerial photographs of the site and the vicinity;
- The National Heritage List for England, the official database of all nationally designated heritage assets; and,
- Historic England Archives.

8.2.61 The Heritage Statement by Donald Insall Associates included at Appendix 8.2 provides a detailed assessment of the significance of the heritage assets on the Project Site and their setting and of the North Tottenham Conservation Area, wider conservation areas and nearby listed buildings. It includes a commentary on the proposals and their impact, including justification in terms of the Planning (Listed Buildings and Conservation Areas) Act 1990 and the policies of the National Planning Policy Framework, and should therefore be read in conjunction with this ES Chapter.

8.2.62 The Planning Act is the legislative basis for decision making that relates to the historic environment, with Sections 66 and 72(I) imposing a statutory duty upon local planning authorities to consider the impact of proposals upon listed buildings and conservation areas. Government policy in respect of heritage assets
is set out in the NPPF (Section 12 Conserving and Enhancing the Historic Environment).

8.2.63 There is no specific national guidance on the methodology for the preparation of impact assessments for heritage assets. The Historic England guidance ‘Seeing History in the View’ (2011) deals specifically with assessing impact upon heritage views and multiple assets and contains an approach to baseline analysis and the assessment of impact; with a series of tables to assist the process. Historic England’s Historic Environment Good Practice Advice, Note 3 ‘The Setting of Heritage Assets’ also provides guidance on the setting of heritage assets.

8.2.64 The methodology set out in the above legislation and guidance is summarised as follows:

- Identify the baseline heritage assets (defined as all data collected from a range of desk based sources and as appropriate, surveys) and their setting;
- Assess the significance/value of the baseline assets and their settings;
- Identify and define the magnitude of impact and the severity of the effects;
- Identify mitigation required and the methodology in terms of spatial extent and techniques to be deployed; and
- Assess the development impact and its effect on the significance of the asset taking into consideration any mitigation proposed.

Significance Criteria

8.2.65 The significance of a heritage asset is defined as ‘The value of a heritage asset to this and future generations because of its heritage interest; that interest may be archaeological, architectural, artistic or historic’ (the NPPF Annex 2, Glossary). Assets can be designated or un-designated. Designated assets are so designated in accordance with national or international criteria (conservation areas are a local authority designation, though determined through legislation) and have statutory protection. In assessing the significance of an asset, Historic England has outlined a number of values which contribute to overall significance. These include evidential, historical, aesthetic and communal value [Conservation Principles – Policies and Guidance for the Sustainable Management of the Historic Environment (2008)]. Non-designated heritage assets may exhibit equivalent values to those which have been granted statutory protection.

8.2.66 Setting can also contribute to significance. Setting is not simply a visual consideration and specific guidance on the analysis setting and its contribution to significance is set out in the NPPG (2014) and in Historic England’s ‘Historic Environment Good Practice Advice in Planning’ (2015).

8.2.67 The significance of the heritage assets within the study area is assessed in the Heritage Statement by Donald Insall Associates (Appendix 8.2) and set out in the Baseline Conditions below.

8.2.68 Magnitude of Impact

8.2.69 Impacts can be direct or indirect, and can be characterised in terms of timing, scale, duration, reversibility and the likelihood of the impact occurring. Impacts can be short, medium or long-term, permanent or temporary and can be positive or negative.

8.2.70 An impact can occur to the setting of a heritage asset such that significance is affected. Guidance on how to establish impact on an asset’s setting is set out by the NPPG (2014).
8.2.71 The magnitude of an impact can vary from ‘major’ to ‘no change’ as set out in Table 8.1, and can be 
beneficial, adverse or negligible.

Table 8.1: Factors influencing the assessment of magnitude of impacts

<table>
<thead>
<tr>
<th>Impact Rating</th>
<th>Description of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Beneficial</td>
<td>Impacts which ensure the long-term future of designated heritage assets, for example by providing a viable and appropriate use and/or, putting into good repair and conserving the most significant fabric of a listed building.</td>
</tr>
<tr>
<td>Moderate Beneficial</td>
<td>Impacts which would improve the character and/or setting of conservation areas and improve the setting of listed buildings.</td>
</tr>
<tr>
<td>Minor Beneficial</td>
<td>Impacts which provide some positive benefits to the historic fabric and/or setting of heritage assets, but may also have dis-benefits.</td>
</tr>
<tr>
<td>Negligible</td>
<td>the Project would make no material alteration to the status quo.</td>
</tr>
<tr>
<td>Minor Adverse</td>
<td>Impacts which create dis-benefits to heritage assets or their setting, but also provide benefits.</td>
</tr>
<tr>
<td>Moderate Adverse</td>
<td>Impacts which result in the loss of less significant fabric in a listed building, the total loss of non-designated heritage assets in a conservation area or have an adverse impact on the setting of a conservation area.</td>
</tr>
<tr>
<td>Major Adverse</td>
<td>Impacts which result in the total loss of the significance of a designated heritage asset.</td>
</tr>
</tbody>
</table>

Construction effects

8.2.74 Construction effects will be assessed following the general EIA assessment process including the establishment of the baseline, consultations, assessment of impacts and effects against key aspects of the Project, the scope of the assessment and using the significance criteria outlined in this section.

Operational effects

8.2.75 The same process will be used for the assessment of operational effects as outlined for construction effects above.

Cumulative effects

8.2.76 The construction of the Project will generate economic stimulus for development within its environs.

8.2.77 The following consented developments have the potential to give rise to a cumulative impact in views along the High Road due to their height, mass and scale, combined with their proximity to the Project site.
Geographical Scope

8.2.78 The geographical scope of the chapter includes the Project Site, and its setting insofar as this relates to the North Tottenham Conservation Area. It also includes the wider study site, comprising the North Tottenham Conservation Area and other conservation areas to the south and west. Since the Scoping Report was written and in consultation with Historic England and the London Borough of Haringey, the geographical scope has been extended to include the long views towards the site from Alexandra Palace, in addition to views from Scotland Green, Bruce Grove, Tottenham Green, Bruce Castle and Tottenham Cemetery Conservation Areas. These Conservation Areas are all located some distance south and west of the site, but are included within the scope in order to assess the impact of the proposed towers on the character and significance of each conservation area in terms of their wider setting and, where applicable, in terms of the wider setting of the listed buildings within each conservation area. Viewpoints from each conservation area have been agreed with the London Borough of Haringey and are shown on the map at Appendix 8.4.

Assumptions and Limitations

8.2.79 A number of indicative views, agreed with the London Borough of Haringey, are assessed in this chapter to establish the impact of the proposals on the heritage assets within the boundary of the Project Site and within its immediate and wider setting.

8.2.80 A limitation of the indicative views is that not every view of the site affecting the North Tottenham Conservation Area, the conservation areas further south and west, and the setting of nearby listed buildings can be assessed, however care has been taken to identify the most sensitive areas within the conservation areas and views are taken from positions close to listed buildings in order to accurately assess the impact of the Project on their settings. Furthermore the indicative views do not reflect all seasonal changes throughout the year; the views were taken during the summer months.

Consultation

8.2.81 Planning and Conservation Officers at Haringey Council, the Greater London Authority (GLA) and Historic England have been consulted regularly during the development of the Project. Local amenity societies, such as the Tottenham Civic Society, have also been consulted.

Baseline Conditions

8.3.1 This section describes the existing environment within the Project Site and the wider study area that will be directly affected by the Project. A detailed analysis of the historical development of Tottenham High Road and its environs, including the history and development of the Tottenham Hotspur Football Club and
stadium site, is included in the Heritage Statement by Donald Insall Associates at Appendix 8.2 and is not therefore repeated here to save duplication.

8.3.2 In terms of EIA, the ‘baseline’ of the assessment is the condition of the site at the time the application is made, and this is described below. However, the current conditions on the site are transient and therefore in some respect an artificial representation, as many recent changes to the site have come about as a result of the initial implication of the consented scheme. As a result, the impact of the proposals will be assessed against both the baseline conditions and the consented scheme, as if the consented scheme had been built and therefore formed the baseline conditions. Assessing against the consented scheme provides a useful cross reference to what the London Borough of Haringey concluded would be acceptable previously in terms of the impact on cultural heritage. This assessment is provided in Section 8.9 of this report.

Character, Spatial Analysis and Special Interest of the Project Site

8.3.3 The majority of the area of the Project Site north of Paxton Road has been cleared in accordance with approved applications HGY/2010/1000, HGY/2011/2350, and HGY/2011/2351 and in its current form detracts from the setting the conservation area, nearby listed buildings and non-designated heritage assets. The football stadium stands at the southern end of the site adjoined to the west by a large car park and smaller temporary buildings associated with the football ground. None of these structures are of any historic or architectural interest, but the stadium has significant cultural and communal value.

8.3.4 At the western boundary of the Project Site, between the stadium car park and the High Road are four historic buildings: Warmington House 744 High Road, listed Grade II and three locally listed buildings; 746, 748 and 750 High Road. The significance of these buildings is summarised in the paragraphs below and assessed in more detail in the Heritage Statement at Appendix 8.2.

8.3.5 Warmington House at 744 High Road is a Grade II listed building that, despite its current poor state of repair and the total loss of its historic garden and terrace setting, on balance makes a positive contribution to the North Tottenham Conservation Area and the streetscape. The building is significant both for its architectural quality and for its historic value. It is representative of the early development of Tottenham in the early-19th century when the area remained a wealthy residential address, and also has historic value for its association with the engineer J. A. Prestwich, whose family lived in the building between circa 1888-1910.

8.3.6 The front elevation of Warmington House is relatively plain and in its current condition, with boarded windows, failing stucco peeling from the walls and poor-quality exposed brickwork resulting from its lack of a viable use and the recent demolition of 744A and 742 High Road, carried out in accordance with planning and listed building consent of 2011 (ref: HGY/2010/1002 and HGY/2011/2224), it arguably detracts from the character of the conservation area. The building is, however, worthy of its Grade II listed status and much of the original internal plan form and fixtures and fittings survive including the original staircase, joinery and decorative plaster ceilings. The interior has been subject to some change, particularly on the ground floor which has been substantially altered as a result of long-term commercial use. There are also modern additions on the upper floors and the majority of the original panelled doors have been removed.

8.3.7 The building has no meaningful setting and this compromises its overall significance. Warmington House
was constructed as a detached villa with a long rear garden plot and an enclosed forecourt. Between 1844 and 1864 a villa of similar-sized plan form was constructed immediately adjoining the southern elevation of Warmington House, infilling the gap between the building and a third villa to the south that is also depicted on the 1844 map. The villa adjoining Warmington House was demolished and replaced by a new infill building, also immediately abutting Warmington House, between 1935 and 1955 and this later infill building was demolished in 2014.

8.3.8 Warmington House was abutted by smaller buildings on the northern side in the mid-late-19th century and its northern return elevation has been concealed in views from the High Road since at least 1864 when the original neighbouring dispensary building, demolished and replaced by the current dispensary on the same site c.1906, was built. Warmington House effectively formed part of a terrace in views from the High Road on its northern side from the early-20th-century (pre-1935) when No.744A was built. This addition was also demolished recently leaving Warmington House detached in the streetscape.

8.3.9 The historic rear setting of the building was altered by the construction and expansion of the adjoining stadium and its associated grounds. There is now no evidence of the former rear garden, as the rear plot has been subsumed into the THFC car park. The THFC stadium is visible in views of the building looking east, north east and south east across the High Road and has a negative impact on the wider setting of the listed building. The forecourt area has a concrete surface and a low modern boundary wall that detracts in views along the street.

8.3.10 The three locally listed buildings at 746, 748 and 750 High Road overall make a positive contribution to the North Tottenham Conservation Area, although elements of the buildings detract from the street scene and the character of the conservation area and the buildings currently have no meaningful setting.

8.3.11 The historic significance of the former Tottenham and Edmonton Dispensary at 746 High Road lies in its original use as a dispensary and its connection to an aspect of the early development of healthcare in England before the establishment of the National Health Service in 1948. As an early provider of healthcare, this building would have been important to the local community, but has not been used as a dispensary for decades and is currently vacant with the windows boarded.

8.3.12 The principal red brick and Portland stone façade to the High Road is of architectural significance and the ground-floor shopfront is of particular merit. The shop front is of an attractive design, constructed in high-quality stone and forming an important link with the building’s original use. To the rear there is a utilitarian two-storey extension which was not part of the original design and detracts in views from the High Road through the gap between the Dispensary and Warmington House. The recently exposed southern return elevation also detracts in views north along the High Road.

8.3.13 Internally the primary and secondary staircases survive as well as some architectural mouldings at first-floor level but these of no particular architectural quality and make no positive contribution to the character of the conservation area which, as a non-designated heritage asset, is the buildings primary significance.

8.3.14 The Red House, 748 High Road has historical significance for its origins as a coffee house and association with the late-19th-century temperance movement which sought to provide an alternative to the public house as a meeting point for the working classes. The building also has historic and communal value for its association with Tottenham Hotspur Football Club from 1922. In particular it is significant for
The building has some architectural significance but this has been reduced by the replacement of the original ground-floor coffee house frontage with a less attractive brick elevation that relates awkwardly to the rhythm of bays on the upper floors. The modern replacement oriel window on the first floor is of poor quality and also detracts, but once formed the platform for the well-known Tottenham Hotspur clock and cockerel (now housed in Lilywhite House) and therefore has some historic significance and communal value. There are a number of later additions to the building that further detract from the conservation area and the streetscape. To the rear, eastern elevation, of the building there is a single-to-two-storey extension which is unattractive.

The interior of the building makes no contribution to the character of the conservation area and, with the exception of the first floor front room, has been substantially altered and subdivided. The first floor front room has some historic and communal significance in its later use as the office of the Tottenham Hotspur manager Bill Nicholson, a much-admired key figure in the history of the Club.

The former White Hart Public House, 750 High Road has significance in its construction as an ‘improved’ public house in direct response to the growth of the Tottenham Hotspur Football Stadium. However, as the stadium has continued to grow the building has become redundant and has long since lost its association with the club. The building is typical of the late-Victorian/early-Edwardian period and has some architectural quality. Overall it makes a positive contribution to the street scene but changes to the setting of the building have compromised its contribution to the character of the conservation area and elements of its exterior, including the modern shop front signage and exposed northern return elevation, detract from the character and appearance of the conservation area.

The setting of the building and its relationship to the streetscape has been substantially altered as a result of the recent developments associated with the construction of the new stadium. The building was designed as part of a terrace stretching to the north and was not intended to address the street as a detached building. This is particularly clear in views south along the High Road in which the exposed northern return elevation of the building detracts from the character of the conservation area. The front elevation is angled to address the corner with Bill Nicholson Way, but the composition of the corner building is clearly compromised by the lack of an adjoining building to the north. The interior of the building has been substantially altered at lower levels and is of little architectural or historic interest.

The former entrance to the football club ground was via Bill Nicholson Way, between 748 and 750 High Road. This formerly consisted of a traffic barrier flanked by wrought iron gates with decorative work, behind which the steel frame and glass front of the West Stand, constructed in 1980-2, was visible. The decorative gates have been removed and a metal fence has been erected enclosing the car park from the High Road. This fence runs behind 748 and 746 High Road and finishes adjacent to 744 High Road. The ground is now accessed by a traffic barrier to the south of 744 High Road. Temporary hoarding has also been erected to the east of 750 High Road and to the front of 744 High Road.

At the northwest boundary of the Project Site, is a terrace of historic buildings, 790 to 802 High Road, known as the Northern Terrace.

No. 796 High Road (Percy House), together with Dial House at 790 High Road (which is excluded from
the Project Site but forms part of its immediate setting), is a Grade II* listed building that makes a positive
contribution to the conservation area. Grade II* buildings comprise only 5.5% of all listed buildings and
No. 796 and Dial House are therefore considered to be of ‘more than special interest’. Nos. 792 (excluded
from the Project Site), 794, 798, 800 and 802 High Road are all Grade II listed buildings that also make a
positive contribution to the conservation area. Nos. 794-802 are collectively named the Northumberland
Terrace after the Duke of Northumberland who replaced the former Black House with the terrace in the
mid-18th century. Dial House is a comparatively rare survival which is outwardly reasonably intact and
although the interior was substantially altered following a fire in 1982, its early (17th-century) origins and
handsome exterior merit its listed status. It occupies a prominent location within the street scene,
standing proud of the rest of the Northern Terrace and immediately adjoining the pavement. Percy House
is highly significant as a relatively unaltered example of an early Georgian house. It occupies a prominent
location within the street scene, standing proud of the rest of the Northern Terrace and immediately adjoining the pavement. Percy House

8.3.22 Nos. 792, 794, 798, 800 and 802 are significant both for their architectural quality and for their historic
value. They are early surviving examples of Georgian architecture that are representative of the wealth
and social status of the Tottenham High Road in the Georgian period. The surviving grand classical
doors in particular allude to this affluent past. The potential for archaeology on and around the site of the
terrace is considerable.

8.3.23 No.804-806 High Road and 814 High Road, constructed in the late 19th century and 1905 respectively,
are not statutorily listed but overall make a positive contribution to the character and appearance of the
conservation area. No.814 is included on Haringey Council’s local list. Constructed during the Edwardian
period as a bank, the design of No.814 reflects this original role and it has a prominent corner location at
the junction between the High Road and Northumberland Park.

8.3.24 The rear setting of the Northern Terrace has been substantially altered and, with the exception of the
legible remaining historic rear plots, does not contribute significantly to the significance of the buildings.
The rear elevations of the entire terrace have also been marred by additions that detract from the
significance of the buildings including later extensions, satellite dishes, bars to windows, unruly foliage
and unsightly fire escapes. Some of the original rear garden plots have been replaced by a car park,
while the rear gardens to the south of the terrace have been paved over and left untended.

Condition of the Buildings on Site

8.3.25 Warmington House is in a very poor condition and is included on Historic England’s Heritage at Risk
(HAR) Register. The building has a Grade C priority on the register which recognises that the building is
in ‘slow decay; no solution agreed’. The listed building is vacant and has been without a viable use for
some time.

8.3.26 All three of the locally listed buildings are of a fair condition externally, although all require maintenance
and redecoration. The former Dispensary and the former White Hart Public House are vacant and,
although weather-proof they are in a poor condition internally due to lack of viable use, while 748 High
Road is in use as offices by the Tottenham Hotspur Football Club and is in good condition internally.

8.3.27 Nos. 794, 798, 800 and 802 High Road are all in a good condition externally. Only the interior of No. 794
has been assessed – this is also in generally in good condition but the multiple-occupancy use is
imposing increasing wear and tear on the remaining internal historic fabric.

8.3.28 Percy House, 796 High Road is in a fair condition externally, but the windows are in poor condition and the railings, gate piers and doorcase require maintenance. The interior of the building is in poor condition and in need of extensive repair and redecoration. As the building is vacant and has no use it has been included on Historic England’s HAR Register. The building has a Grade C priority on the register which recognises that the building is in ‘slow decay; no solution agreed’, however this has now changed with planning and listed building consent recently granted for the restoration and conversion of the building for use as the Tottenham Hotspur Foundation headquarters.

8.3.29 The Grade II* listed building at 810 High Road is considered to be in a ‘fair’ condition but is vacant and has a Grade D priority on the HAR Register which recognises that the building is in ‘slow decay; solution agreed but not yet implicated’. No. 808 High Road was restored in 1989 and was converted for use as a dental surgery and is in a good condition externally, whilst the interior has not been inspected.

Character, Spatial Analysis and Significance of the North Tottenham Conservation Area and Wider Study Area

8.3.30 As described above, the study area includes the North Tottenham Conservation Area and its setting (the areas which form the setting of the North Tottenham Conservation Area described below, separately as ‘fringe areas’) and also takes into account long views towards the Project Site from the conservation areas further south and to the west. The conservation areas in the wider area include Scotland Green, Bruce Grove, and Tottenham Green Conservation Areas to the south, which form part of the ‘Tottenham High Road Historic Corridor’ which stretches approximately 3.7km between Enfield to the north and Stamford Hill, and Bruce Castle, Tottenham Cemetery and Alexandra Park and Palace Conservation Areas to the west.

8.3.31 The study area is predominantly urban in character, formed of mainly 19th-century buildings interspersed with 18th century buildings and some of the 20th century. The High Road is a wide, busy road which is fronted almost continuously by terraces of three or four storeys, with commercial uses at ground floor. There are also interspersed within the frontage a number of larger civic, educational and religious buildings. White Hart Lane, which adjoins the High Road on its western side is characterised by terraces of two and, occasionally three storeys once again with largely commercial uses at ground floor level. Bruce Grove which also adjoins the High Road to the west, and continues diagonally northwest, is characterised by terraces of two to three storeys, some in residential use although many with commercial uses at ground floor.

8.3.32 The length of Tottenham High Road stretching from Stamford Hill at the southern end up to the junction with Fore Street at its northern end has a long history of development and change. This has resulted in a varied streetscape comprising buildings of contrasting periods and quality, some immediately abutting the general pavement line and others set back behind enclosed landscaped plots, tree-lined greens or wider public paved areas.

8.3.33 The origins of the High Road date to the Roman period, its route following the path of the major Roman road of Ermine Street that linked London with Lincoln and York. It therefore has wider significance as part of England’s Roman road network and incorporates areas of potential archaeological importance. The earliest surviving buildings along the High Road generally date from the early Georgian period, although these were preceded by earlier houses and farmsteads. Fuelled by the High Road’s importance as a vital
transport link between London and the north, high-quality residential dwellings were built during the early Georgian period among the established farmland. Only a small number of these early Georgian houses remain, the most substantial and significant group being those at the northern end of the High Road close to the junction with White Hart Lane.

8.3.34 The character of the High Road changed substantially in the 19th century when additional roads were built and the area saw a sharp rise in the population. With the construction of the railways, in particular the opening of the Great Eastern Railway in the 1870s, came further significant change as large areas of the former agricultural landscape were developed to accommodate terraced housing and a number of factories were established in the Tottenham area. The consequent changes, including the gradual commercialisation of the High Road, shaped the long-term character of the area resulting in a notable shift in the demographic of the population of Tottenham from wealthy city merchants to lower-middle and skilled working classes.

8.3.35 As in so many of London's boroughs, the legacy of mid-late-19th century buildings along the High Road, including terraced residential and commercial properties, churches and public houses, remains the predominant period of architecture. These are interspersed with the remaining Georgian buildings at the northern end of the High Road as well as later Edwardian and interwar buildings. The mid-late-20th-century architecture along the High Road is generally of mediocre quality. This reflects the general lack of available finance immediately after the war but also a gradual economic decline in the area from the 1970s as factories in Tottenham closed and its industrial base faded.

8.3.36 In keeping with the urban character of the High Road, public open spaces immediately adjoining the road are limited in number. Tottenham Green and Page Green Common are the principal areas of open space, while smaller open areas include the narrow greens in front of the Tottenham Community Sports Centre at 701-703 High Road and at Page Green Terrace further south. All four spaces provide welcome greenery in the streetscape and a foil to the busy traffic along the High Road.

North Tottenham Conservation Area (Including White Hart Lane)

8.3.37 The North Tottenham Conservation Area, extending from the northern boundary of the London Borough of Haringey with Enfield to northern side of Scotland Green, has the greatest variety of building styles and periods of all of the six High Road conservation areas. This is particularly relevant to the northern stretch of the conservation area from the junction with White Hart Lane up to Brantwood Road where the terraced buildings comprise an interesting mix of architecture dating from the 18th to late-20th century. This part of the High Road has a notably urban and enclosed character with two and three-storey terraced buildings immediately fronting the street and mostly incorporating ground-floor shop fronts.

8.3.38 White Hart Lane, although narrower than the High Road, is also a busy traffic thoroughfare that has connected Wood Green to the west since the medieval period. It is flanked at its eastern end by Victorian terraces and, although altered, these collectively make a significant contribution to the character of the street and provide a historic link with the late-19th-century development of the railway and nearby station. In addition to these, a small number of early-19th century buildings and one Grade II listed 18th-century villa add further historic interest to the streetscape. The majority of the southern side of White Hart Lane is flanked by two residential blocks forming part of the Whitehall Street/Love Lane estate and their associated gardens/hard landscaping. Like the rest of the buildings on the estate, these are excluded from the conservation area. Despite the large area covered by the residential estate and the scale of the buildings, particularly the tall tripartite tower blocks, the estate buildings are substantially set back from
the High Road and therefore have a limited street presence in views along the road. Those on the southern side of White Hart Lane have the greatest impact on the setting of the conservation area in terms of street views but again their visual impact is mitigated by their position set back from the road and by adjoining mature trees.

8.3.39 Returning to the High Road, the Georgian terraced buildings at Number 792 to 802 opposite the entrance to White Hart Lane are set back behind private enclosed front plots. This gives a more open feel to the street although the front boundary walls maintain some sense of enclosure. Beyond this, the western side of the High Road is predominantly flanked by Victorian terraces with ground-floor shop fronts. The rhythm of these is interrupted by Bergen apartments and Kathleen Ferrier Court, mid-late-20th-century apartment blocks that are set back from the prevailing building line. On the eastern side of the road former buildings have been demolished in preparation for the proposed stadium development opening up previously obscured longer views of the current stadium and the adjoining remaining industrial buildings.

8.3.40 The completed demolition works on the eastern side of the High Road have exposed the plain return elevation of 750 High Road (Valentino’s) which was never intended to be visible and detracts in views south along the street. The southern return elevation of Dial House, similarly exposed, has been rebuilt in non-matching brick.

8.3.41 The buildings at 744-750 High Road including Valentino’s, the Red House, the Tottenham Dispensary and Warmington House also appear isolated in the streetscape following the demolition of the terraced buildings adjoining 750 High Road and of the terrace formerly adjoining the southern side of Warmington House. They still provide some continuity in the streetscape in views north along the High Road, in which the stadium redevelopment site is mostly concealed, but in this view the recently exposed return elevation to 746 High Road detracts. The recent demolition of the early-20th-century extension to Warmington House (No.744a) has left an awkward gap between this listed building and 746 High Road through which the later plain brick rear extension to 746 is visible.

8.3.42 Opposite the cluster of buildings on the Project Site, the Church of St Francis De Sales is set back from the road. This combined with the open areas further south of the church, including the tree-enclosed tennis courts, the green south of Church Road and the substantial widening of the pavement south of Warmington House, adds to the more open character of this part of the High Road.

8.3.43 The character of the southern part of the North Tottenham Conservation Area has remained largely unchanged from its original development and has some historic value in relation to its use; although Nos. 695-697 High Road, originally built as residential properties are now in commercial use as offices. The area has communal value as it provides shops and residential accommodation to local people.

8.3.44 Beginning on the western side of the High Road, on the corner of Ruskin Road, Tottenham Baptist Church is a classical Grade II listed building constructed in 1825 to designs by J. Clark. In grey brick with painted stone detailing it has a stucco parapet and cornice. The eastern, front elevation has a central bay which projects slightly forward with a Venetian window at first-floor level; this sits above a prominent Doric portico with four columns accessed by a short flight of steps. It is set back from the High Road with a landscaped forecourt and attractively designed railings and gates with unusual box-section piers. The Chapel is adjoined to the west by the locally listed Baptist Hall and the Grade II listed No. 699, both two-storey Victorian buildings located on Chapel Stones, an enclosed alleyway. The brick boundary wall enclosing No. 699 extends west along the alley and south toward Pembury Road and is also listed at
Grade II. Just within the western boundary of the conservation area is No. 2 Kings Road, a Grade II listed building dating from the early-mid 19th century of two storeys and yellow-stock brick. Its principal façade to Kings Road has a broad gable containing an arched attic window; its eastern elevation displays a plaque inscribed ‘JAMES PLACE 1812’.

8.3.45 Returning to the High Road, south of the Baptist Chapel is Nos. 695-697, a pair of large three-storey early-19th century buildings constructed from London-stock brick with a stucco ground floor. These Grade II listed buildings are set within a courtyard enclosed by modern replica boundary walls of brick and with gates and railings to the High Road. Immediately adjacent there is a modern housing development of a similar scale built in 2007-2008. Nos. 685-689 High Road form a locally listed terrace of mid-late-19th century red-brick buildings of four storeys with projecting single-storey shop units and residential flats on the upper floors. Two terraces of the same design continue to the south.

8.3.46 On the eastern side of the High Road the buildings from Bromley Road to Argyle Passage form a terrace of largely Victorian buildings with retail units at ground-floor level. No. 710, a 19th-century three-storey brick building with a splayed corner and No. 708, a more simply designed two-storey building, both make a positive contribution to the conservation area. The shop front to No. 710 retains its original pilasters, corbels, stall risers and cornice, as does the locally listed Nos. 704-6, the decorative façade of which remains largely intact. Adjacent is No. 702-700, presently obscured behind scaffolding. No. 698 is a locally listed building of three storeys and constructed in brick with a stucco parapet and cornice, although the windows have been replaced with modern uPVC windows. Nos. 694-692 are also of three storeys and originally part of the same terrace. The cornice and parapet to the buildings has been lost, the facades rendered and modern projecting shopfront inserted; as a result they detract from the conservation area. Nos. 690-686 are a terrace of three late-19th century buildings with bay windows at first-floor level and later projecting shopfronts with modern signage; although altered these buildings are still considered to make a positive contribution to the area and are locally listed. Just south of Argyle Passage is the locally listed Nos. 684a-b, a symmetrical three-storey early-20th century stuccoed building with a prominent parapet cornice. At second and third-floor level are four stars with six points to four air vents which appear like the Star of David; this is presumably a reference to its original use.

8.3.47 As is the case along much of the High Road, there are a number of improvements that could be made to the buildings which would better reveal their significance and the contribution they make to the conservation area. These improvements largely relate to the terraced buildings on the eastern side of the High Road and include the improvement of modern shopfronts and the reinstatement of lost detailing where original shopfronts survive. The replacement of uPVC windows with sashes where appropriate would also be a big improvement.

8.3.48 South of Bromley Road, the High Road narrows again. As at its northern end, this part of the High Road is flanked by a more continuous rhythm of tightly-packed terraced buildings with ground-floor shop fronts (Plate 6). The majority of these buildings date from the Victorian period but there also a number of mid-late-20th-century infill additions and some earlier buildings. The latter include the 18th-century terraced buildings comprising 662-670 (even) High Road, all of which are individually listed at Grade II. These have been more substantially altered and not as striking as the Georgian Terrace opposite White Hart Lane but are nevertheless of high significance. Number 662 was seriously damaged by fire during the riots in the summer of 2011 and is currently under repair.

8.3.49 Beyond Hampden Lane the general character changes again as the street is flanked by larger office and
residential buildings with a less prominent street ‘presence’. The lively Dutch-gabled façade of the recently renovated building at 639 High Road (now the 639 Enterprise Centre) provides an exception to this incorporating a handsome row of arched shop fronts. The residential blocks at the southern end of the conservation area are set back from the road and partially concealed from view by rows of mature trees.

8.3.50 The grassed area adjoining the sports centre and the two early-19th-century houses at 705 and 707 High Road is the only significant public space immediately adjoining the High Road in the North Tottenham Conservation Area. This attractive green, incorporating mature trees and providing welcome greenery in the streetscape, must date from when the latter buildings were erected and is therefore of both historic and streetscape value. There are many communal areas, including a park and various greens spaces, in the modern residential estates. Although these have no heritage value they currently provide important public spaces.

8.3.51 The boundary railings to Northumberland Terrace form a significant element of the public realm, particularly the railings and gate piers to Percy House which are individually listed at Grade II*. These are prominent in views east along White Hart Lane.

8.3.52 The North Tottenham Conservation Area includes over twenty statutorily listed buildings, the largest number of listed buildings of all six conservation areas forming the Tottenham High Road Historic Corridor. These are listed in Appendix 8.1. Over thirty buildings in the North Tottenham Conservation Area are included on the London Borough of Haringey’s local list and are therefore considered to be non-designated heritage assets. There are also a number of unlisted buildings that are not statutorily or locally listed but overall are considered to make a positive contribution to the conservation area. These are listed in Appendix 8.1. Notwithstanding this currently in the vicinity of the proposals site the conservation area is so degraded as to have little quality or value.

8.3.53 The significance of the North Tottenham Conservation Area, outlined in full in the Heritage Statement at Appendix 8.1 can be summarised as follows:

8.3.54 The heritage significance of the North Tottenham Conservation Area, into which the western edge of the application site extends, can be summarised as follows:

8.3.55 High significance:

- Tottenham Hotspur Football Stadium, ‘White Hart Lane’, and Tottenham Hotspur Football Club have been established in Tottenham for over 130 years. The stadium and the world-renowned Spurs club are synonymous with the cultural history of the area.

- The High Road and White Hart Lane in the context of the historic road network. The High Road follows the route of the Roman Ermine Street, the ancient route from London to the north, while White Hart Lane was established in the medieval period as the route from the High Road to Wood Green and the west.

- The remaining 18th-century buildings, including those within the Northern Terrace, are mostly statutorily listed and are of national importance with three designated at Grade II* being of ‘more than special interest’. Their relatively unaltered principal elevations contribute positively to the character of the conservation area and the buildings provide an important historic link with Tottenham’s Georgian past as a wealthy residential address for city merchants.

- The statutorily listed early-19th-century buildings, including Warmington House at 744 High Road, and the
Grade II listed, late-19th-century St Francis de Sales Church are also of high architectural and historic significance.

8.3.56 Significant:

- The unlisted Victorian and Edwardian architecture in the area is collectively significant being representative of the growth of Tottenham following the establishment of the railways. The railway and associated industrialisation saw a shift in the social status of the area from an enclave of the upper classes to a middle and working class suburb.
- Those buildings, in addition to the football stadium, that are of significant cultural heritage value. These include the schools, churches, chapels, public houses, the Coombes Croft Library and the Tottenham Community Sports Centre. The latter building and 684 High Road, which is locally listed, are the only interwar buildings in the conservation area that also have intrinsic architectural significance, their front façades being of a handsome design.
- The historic green fronting the Sports Centre and Numbers 705 and 707 High Road was established in the early-19th century and is a significant historic open space in the North Tottenham Conservation Area.

8.4 Low significance:

- The post-war buildings in the conservation area are generally of low significance and either make a neutral contribution to or detract from the character of the conservation area and/or streetscape. The majority of the buildings from this period also have low communal value.
- A number of historic buildings in the study area have modern rear extensions and/or modern shop fronts and fenestration that detract from the overall appearance of the buildings and collectively result in substantial harm to the character of the conservation area.

The Condition of the North Tottenham Conservation Area

8.4.1 The North Tottenham Conservation Area is included on the Historic England Heritage At Risk Register as a ‘Conservation Area At Risk’ with its overall condition described as 'very bad'. Although a substantial proportion of the historic buildings in the conservation area remain in their original uses, primarily retail with residential use on the upper floors, most are suffering from lack of general maintenance. This indicates that in the current economic climate their uses are not viable long term and that they require investment in order to secure their long-term future. The overall condition of the buildings has a negative impact on the character and appearance of the conservation area.

8.4.2 In addition to 744 (Warmington House), 796 (Percy House) and 810 High Road, all of which are included in the Project Site, the Grade II listed 662 High Road is also included on Historic England’s Heritage at Risk Register with its condition noted as ‘very bad’ and with a Grade B priority denoting ‘immediate risk of further rapid deterioration or loss of fabric; solution agreed but not yet implemented’.

8.4.3 The concluding report of the Mayor of London’s Independent Panel on Tottenham, ‘It Took Another Riot’ published after the Tottenham riots in 2012 comments on the built environment of Tottenham as a whole:

8.4.4 ‘Tottenham’s physical landscape is fraught with the consequences of its faded industrial legacy, coupled with poor planning strategies which created large-scale social housing projects in the latter half of the last century. A clear lack of planning enforcement has resulted in many badly managed streets and spaces, ranging from dwellings being used as shops, through to crumbling walls and more run-of-the-mill
symptoms such as unauthorised erection of satellite dishes […] New planning approvals, if delivered by skilled architects, will promote regeneration in Tottenham, helping change the perception of the area and introduce facilities and more welcoming public spaces for residents and visitors.

8.4.5 The report notes the following on the Tottenham Hotspur Football Stadium: ‘We applaud Tottenham Hotspur FC’s decision to stay in the area. The football club gives Tottenham global recognition, and the decision to redevelop White Hart Lane is a strong sign of confidence in the area. It carries significant regeneration potential with the promise of new housing and retail units that bring jobs, as well as the opportunity to serve as a catalyst for wider change in the area. Public realm improvements, estate renewal and a new railway station are all critical to capture the benefit of this investment.’

**Fringe Area – West of Tottenham High Road and North of White Hart Lane**

8.4.6 This area forms part of the setting of the North Tottenham Conservation Area, adjoining its western boundary along the northern end of the High Road and the boundary along the northern side of White Hart Lane.

8.4.7 The area is characterised by the Peacock Industrial Estate and its associated buildings. This industrial estate is an evolution of the area’s original light-industrial character which developed from the mid-19th century. The area of market gardens and the former Brunswick Brewery remain in light-industrial use today. The northern part of the area is characterised by the Peacock Industrial Estate with warehouses relating to car mechanics and building services. There was a Sainsbury’s, which has since closed and has been superseded by a new, larger Sainsbury’s on Northumberland Park. The large supermarket car park remains here with some smaller shops along its edge. To the north of the former Sainsbury’s there is a new development currently under construction named Brook House. This comprises a comprehensive redevelopment of the former Cannon Rubber Factory, including the erection of a 22-storey building to provide 100 residential units, as well as commercial floor space, a primary school and car and cycle parking.

8.4.8 The only buildings of historic and architectural significance in the area are the former Roman Chapel and Pastor’s House on Chapel Place. Both are of two storeys and constructed in yellow stock brick. The chapel altar was restored in 1997 and the building was subsequently locally listed. The area has some communal value as it provides a place of work and income to local people and businesses.

**Fringe Area – West of Tottenham High Road and South of White Hart Lane**

8.4.9 This area forms the setting of the western boundary of the North Tottenham Conservation Area and is characterised by residential housing. To the north of the area the majority of the housing is social and ex-social housing, comprising the Whitehall Street/Love Lane Estate. The buildings were constructed during the 1960s and comprise three towers with a T-shaped plan and of ten storeys: Moselle, Ermine and Charles House and smaller low-rise apartment blocks of three to five storeys. The new housing estate reflects its historic past through it names: Moselle, the river that used to run through Tottenham; Ermine, the Roman Road which ran to the west of Tottenham High Road; and Charles House, the mid-19th century street it replaced.

8.4.10 There is little of historic significance to the north of the area which was completely redeveloped in the mid-late 20th century. There is, however, to the west of the railway line, a small pocket of mid-late-19th century development formed of a small terrace of three storeys with modern retail units at ground floor to
White Hart Lane and a four-storey red brick and stock brick Public House, the Railway Tavern, to the corner of White Hart Lane and Stamford Street. The public house is currently vacant and boarded up. It has a prominent corner location with a red brick gable and its original shopfront formed of pilasters, cornice, fascia and stallrisers.

8.4.11 The southern section of the area, between Ruskin Road and the southern east-west stretch of Pembury Road, is largely characterised by terraces of 19th-century and early-20th century residential housing of two to three storeys. To the south east end of Pembury Road a large post-war development of apartment blocks, Millicent Fawcett Court, occupies the area between the High Road and Pembury Road. A late 20th century block of flats of four storeys forming retirement/sheltered housing, Lowry House, also adjoins Pembury Road north of Lansdowne Road.

8.4.12 The area has communal value as it provides residential accommodation for local people. It also has some historic value in relation to its use, being developed as a residential area from the mid-19th century and remaining as such today.

Fringe Area—East of Tottenham High Road

8.4.13 This area abuts the eastern boundary of the High Road and therefore forms part of the setting of the North Tottenham Conservation Area. This area has a mixed character. The area north of Park Lane is largely characterised by residential housing comprising a mixture of mid-late 19th century, interwar and mid-late-20th-century houses. On the south side of Northumberland Park is the new Sainsbury's superstore.

8.4.14 There are few buildings of historic architectural significance in this area, as much of the area was developed or redeveloped in the mid-late 20th century. Those buildings of significance include the attractive terrace of mid-late-19th-century housing, and a former school, now a church, on Park Lane which makes a positive contribution to the street scene. Nos. 28-44 Park Lane are late-Victorian houses of two storeys and two bays with bay windows with rendered jambs and mullions with pilasters and, at roof level, decorative eaves. Nos. 48-56 are three-storey buildings of stock brick with stone lintels and banding with shopfronts to the ground floor. Elsewhere, Concord House, a four-storey late-20th century apartment block detracts from the appearance of the area.

8.4.15 To the south of Park Lane the area is once again largely characterised by residential housing comprising a mixture of mid-late-19th-century, interwar and mid-late-20th-century houses. Vicarage Road is lined by pairs of mid-late-19th-century houses of two storeys set back behind small front gardens, although the north east end has been redeveloped with late-20th-century blocks of flats of four storeys. The area to the west between Vicarage Road and the High Road has been substantially redeveloped with late-20th-century housing, including Campbell Court, a T-shaped block of flats of nine storeys. To the south of the area is Hartington Park, a public park made up of mainly green open space, with a playground and multi-use games area to the south of the site. Improvement works to Hartington Park were carried out in October 2014.
Scotland Green and Bruce Grove Conservation Areas

8.4.16 Moving into the Scotland Green and Bruce Grove Conservation Areas, the High Road narrows again and is flanked by more tightly-packed terraced buildings. The historic buildings comprise a mixture of Victorian and Edwardian terraced buildings of varying height and width in addition to a small number of inter-war buildings. These are interspersed with numerous, mostly low-quality, mid-late-20th-century blocks. Numbers 581-585 (odd) High Road, one late-18th-century and two early-mid-18th-century houses in the Scotland Green Conservation Area, are statutorily listed but there are no listed buildings in the Bruce Grove Conservation Area.

8.4.17 The Scotland Green Conservation Area adjoins the southern end of the North Tottenham Conservation Area and incorporates the former site of Scotland Green. Here the road narrows but a sense of openness is maintained as the Victorian former Blue Coat School (now Pride of Tottenham Public House) is set back from the road and adjoined to the side and rear by a pedestrianised area linking through to Scotland Green. On the opposite side of the High Road the wide pavement and front landscaped plot to the handsome Georgian properties at 581, 583 and 585 High Road also add to the sense of space.

8.4.18 Unlike at the northern end of the High Road, the majority of the mid-late-20th-century buildings in the Scotland Green and Bruce Grove Conservation Areas align with the flanking earlier terraces. In the Bruce Grove Conservation area, where the pavement narrows, this results in a much more enclosed streetscape. The tight-knit building pattern is broken on the eastern side of the High Road by the low Aldi supermarket, a recent addition to the street. This was built on the site of Sanchez House, a shopping centre that itself replaced a row of almshouses in 1923. Further south along the High Road a new building is under construction on the former site of the Employment Exchange. The late-19th-century Bruce Grove Station building is set back from the street but located much closer to the High Road than White Hart Lane Station. Its design, including Gothic style pointed-arch windows, matches that of the historic White Hart Lane station building showing a clear connection between the two Great Eastern Railway stops.

Tottenham Green Conservation Area

8.4.19 Further south leading towards Tottenham Green, the road widens again and has a more open character with modern apartment buildings, the British Legion Club and two Victorian churches set back behind landscaped plots of either green space or hard-standing parking areas. There are short terraced rows of Victorian and mid late-20th-century buildings fronting the High Road close to the busy junction with Monument Way, marked by the Grade II listed Tottenham High Cross Monument, but this part of the road is predominantly open in character and rather dominated by heavy traffic. Large and imposing municipal buildings mark the northern and southern ends of the conservation area, with The Palace Cathedral (the former Tottenham Palace Theatre) and Police Station to the north and Tottenham Technical College and former Jewish Hospital building to the south. The Palace Cathedral is included on Historic England’s Heritage At Risk Register. The building has a Grade D priority on the register which recognises that the building is in ‘slow decay; solution agreed but not yet implemented’.

8.4.20 Tottenham Green and the smaller Tottenham Green East comprise former common land. They were enclosed with posts and rails for recreational use in the Edwardian and Victorian period respectively. Tottenham Green, formerly Trinity Church Common, is recorded on historic maps dating from 1619 and is flanked by large institutional Edwardian buildings on its western side. Tottenham Green East was previously known as Hospital Common and remains overlooked by former hospital buildings. Both areas incorporate mature London plane trees and are significant historic open spaces that are included on
Bruce Castle Conservation Area

8.4.21 The Bruce Castle Conservation Area adjoins Bruce Grove Conservation Area to the northwest following the line of Bruce Grove northwest to Bruce Castle Park where the conservation area widens to take in the open space. The character and appearance of the conservation area can be divided generally into two with the relatively quiet open area at the northern end, focused around Bruce Castle Park and the adjoining Tottenham Cemetery Conservation Area, and the southern end exhibiting a more diverse urban character, with Bruce Grove becoming increasingly commercial in nature in the vicinity of Tottenham High Road.

8.4.22 Bruce Grove is the highway between Bruce Castle and the High Road; it is a historic route which cuts through the area on a diagonal. As a result the urban plan is at right angles to the street, which is lined with terraced and semi-detached buildings. On the west side of Bruce Grove there are a number of Grade II listed buildings which date to the late 18th century and the early 19th century and include Nos. 1-4 Bruce Grove, an early 19th century terrace, Nos. 5 & 6 a late 18th or early 19th century pair, and Nos. 7-8, 9-10, 13-14 and 15-16 all early 19th century pairs. Further northwest on the east side of Bruce Grove is Edmansons Close, a group of Grade II listed almshouses and a lodge enclosing three sides of a large green with detached wings fronting Bruce Grove. The Sailmaker’s Almshouses date from circa 1870 and are of two storeys and constructed from yellow stock brick with stone dressings and red brick eaves cornices with bands at first floor level. The Lodge is a detached cottage similar in character to the almshouses. The central green is screened in public views from Bruce Grove by large bushes and railings.

8.4.23 There are a number of buildings in the Bruce Castle Conservation Area that are included on Historic England’s Heritage At Risk Register. 7 Bruce Grove is one of a pair (with 8 Bruce Grove) of early 19th century houses listed Grade II. It is vacant and considered to be in a ‘very bad’ condition. The building has a Grade A priority on the register which recognises that the building is in ‘immediate risk of further rapid deterioration or loss of fabric; no solution agreed’. The west wall and the south boundary wall to Bruce Castle Park, listed Grade II and though to date to the 17th century are also both in a ‘poor’ condition. The west wall has a Grade B priority, ‘immediate risk of further rapid deterioration or loss of fabric; solution agreed but not yet implemented’ and the south boundary wall, a Grade A priority, ‘immediate risk of further rapid deterioration or loss of fabric; no solution agreed’. A public toilet on Bruce Grove, dating to circa 1920 with fine iron work is Grade II listed and considered in a ‘poor’ condition. It has been given a Grade C priority, ‘slow decay; no solution agreed’.

8.4.24 At the north end of Bruce Grove the area opens out to Bruce Castle Park. In the south west corner is Bruce Castle, a grand three storey Grade I listed mansion, which forms the Bruce Castle Conservation Area’s primary landmark. Architecturally it is a composite building, the earliest remaining parts dating from the early 16th century much remodelled during the late 17th and 18th centuries. The building’s principal three storey southern elevation was constructed about 1600 as a symmetrical composition in red brick with roofs concealed behind a parapet and prominent stone quoins and window dressings. The façade is dominated by an ornate central projecting square tower frontispiece built in 1684 containing a ground floor round arched Doric entrance porch with pink-painted stone quoins, and a first floor sash window with pink-painted Ionic pilasters supporting a white-painted bracketed timber balustrade at second floor level. The tower is stuccoed above first floor level and extends above the roof parapet to include a large clock.
at third floor level. To the east side there is a late 18th century three storey brick wing. Immediately southwest of Bruce Castle is a circular red brick tower (also listed Grade I), which is approximately 8m in height and is believed to date from the early 16th century.

8.4.25 The former landscaped park of Bruce Castle in its present form dates mainly from the 19th and 20th centuries, but preserves some features of the 18th Century. Bruce Castle Park is an attractive and well used local space, which provides this part of the conservation area with a sense of openness. It is designated in the Council’s UDP (together with the adjoining Tottenham Cemetery) as Metropolitan Open Land, as a Grade II Ecologically Valuable Site and as a Local Listed Historic Park.

**Tottenham Cemetery Conservation Area**

8.4.26 Tottenham Cemetery occupies a large area adjoining the northern boundary of Bruce Castle Conservation Area. It is bounded by Church Lane and All Hallows Lane to the south and partly by White Hart Lane and Fryatt Road to the north and northwest. To the northeast lies an area of allotments. Tottenham Cemetery was opened by the Tottenham Burial Board in 1858 following the closure of the parish churchyard of All Hallows in 1857 (listed Grade II*). Part of the 5-acre plot was consecrated, with the remainder designated for Non-Church of England burials, with a chapel for each. The pair of chapels, located to the east of the area date from 1856-7, constructed in Kentish ragstone with ashlar dressings, and are listed Grade II. The land was drained, landscaped, with paths laid out and evergreens and shrubs planted. The cemetery was extended to the east and south-west between 1881 and 1887 and to the north of Moselle Brook after 1913 on land that included a large lake with two islands. The cemetery also includes the Tomb of William Butterfield, listed at Grade II, and a Grade II listed War Memorial. The topography of the cemetery is very flat, tightly packed with gravestones traversed by paths. There are a number of mature trees in the cemetery and views in and out of the area are largely screened by these.

**Alexandra Palace and Park Conservation Area**

8.4.27 The Alexandra Palace and Park Conservation Area includes the Grade II listed Alexandra Palace (nicknamed ‘Ally Pally’) and its parkland. Alexandra Palace is a former International Exhibition Hall. The building was designed by John Johnson and Alfred Meeson, completed between 1868 and 1873. The building was serviced by a new railway line from Highgate Station which terminated at a station alongside the north terrace, only the station building of which survives today. Shortly after opening the palace was virtually destroyed by fire; a replacement building opened two years later, also designed by Meeson and Johnson. Covering seven acres it was centred on the Great Hall with four corner towers.

8.4.28 Alexandra Palace is also significant for its ties with the BBC. The BBC’s involvement dates from June 1935 when it leased the eastern part of the building; it was from the surviving BBC studios where the world’s first high-definition television programme was transmitted in 1936. In 1980 a second major fire seriously damaged the Palace (only Palm Court and the area occupied by the BBC escaped damage). The central hall and west end of the Palace reopened in 1988 following restoration.

8.4.29 As well as being included within a conservation area the landscape, Alexandra Palace Park, is registered as Grade II on Historic England’s Register of Historic Parks and Gardens.

8.4.30 The park which forms the setting of Alexandra Palace lies to the north of Hornsey, north-east of Muswell Hill and to the west of Wood Green. The park is surrounded by dense development except to the east where the boundary is formed by the railway line. The Palace, which forms the focus of the park, stands
on a natural platform with extensive views over London to the south; land falls steeply from the platform to the south-east and north-east. The slope to the south-east, was originally laid out with a pattern of informal walks leading down through lawns with trees, shrubs, and informal bedding, although has since been simplified. Due east of the Palace, a miniature golf course was added in the 1920s. On the upper slopes of the park north of this is an oval, hedge-enclosed rose garden at the centre of which is a fountain, moved here following the fire in 1980 from its original site in the Italian Garden which occupied the courtyard of the Palace between the Great Hall and the western conservatory. On the level ground at the foot of the hill is a race course (opened in 1868), the centre of which is now used as a cricket ground. To the north of the Palace is a substantial terrace, supported by Italianate arcades. This covered the new railway station (closed in 1954). Beyond the northern end of this feature a substantial area of hard landscaping has been put in, used for events and car parking. Also to the north of the park is a boating lake. To the south-west of the Palace, an area known as The Grove links the site to Muswell Hill station.

8.4.31 Although the site has been subject to a number of alterations, the arrangement of the original path system can still be traced in most areas of the park.

Summary of the Key Significance of the Conservation Areas in the Wider Study Area

8.4.32 The pattern of development in the Conservation Areas centred on the High Road in the wider study area, including Scotland Green, Bruce Grove and Tottenham Green, was similar to that of the North Tottenham Conservation Area, with initial widespread development beginning along the High Road in the 18th century when this area of North London was a desirable place to live. This was later largely replaced by Victorian and Edwardian development resulting from the catalyst of the arrival of the railway stations and the consequent rapid urbanisation of the area. The heritage significance of these ‘Tottenham High Road Historic Corridor’ conservation areas can be summarised as follows:

- The remaining 18th century buildings are of high significance and are largely statutorily listed in recognition of this.
- The statutorily listed early-19th-century buildings in the wider study area are also of high architectural and historic significance.
- The historic open space of Tottenham Green is of high significance being the only large historic public open space along the High Road ‘historic corridor’.
- The unlisted Victorian and Edwardian architecture in the wider study area is collectively significant, representing the growth of Tottenham following the establishment of the railways.

8.4.33 The Bruce Castle, Tottenham Cemetery and Alexandra Palace Conservation Areas all contain areas of public realm of high significance comprising Bruce Castle Park, Tottenham Cemetery, the open green fronting the Almshouses to Edmansons Close in the Bruce Castle Conservation Area and Alexandra Palace Park.

8.4.34 Bruce Castle Park is designated in the Council’s UDP (together with the adjoining Tottenham Cemetery) as Metropolitan Open Land, as a Grade II Ecologically Valuable Site and as a Locally Listed Historic Park. In the south west corner of the park is Bruce Castle, a grand three storey Grade I listed mansion, which forms the Bruce Castle Conservation Area’s primary landmark. The earliest remaining parts of the building date from the early-16th century although it was much remodelled in the late-17th and 18th centuries. Immediately south west of Bruce Castle there is a circular red brick tower, also listed Grade I, and thought to date from the early-16th century. Alexandra Palace Park is registered Grade II on Historic
England’s Register of Historic Parks and Gardens and includes the Grade-II listed Alexandra Palace which due to its size and location is a prominent landmark in Haringey (and indeed, much of north London).

8.5 Inherent Design Mitigation

Demolition and Construction

Buildings proposed for demolition

8.5.1 Three buildings included on Haringey Council’s local list that make a positive contribution to the North Tottenham Conservation Area are proposed for demolition 746, 748 and 750 High Road. In order to salvage some of their significance it is recommended that fully measured surveys of each building are commissioned and copies of the record material deposited with Historic England, Haringey Council, and the Victorian Society. The records should be written on durable materials in order that they can be considered permanent.

8.5.2 For each building, the records should comprise: historical research, using both archival and secondary material, and a detailed site inspection including room by room analysis. The record should include measured as existing floor plans and a photographic survey.

8.5.3 Before demolition and construction works commence, any fabric that is to be salvaged will be clearly labelled and photographically recorded. Elements that are to be salvaged form the buildings and re-used in the Tottenham Experience Museum include:

- The Portland stone shopfront to the former Tottenham and Edmonton Dispensary;
- The front bay window to the Red House;
- The panelled office on the first floor of the Red House.

8.5.4 Elements that are to be salvaged from the buildings and offered to an appropriate institution, such as the Brooking Collection, include the following:

- 746 High Road: three chimneypieces and mantelpieces, timber staircase balustrade, newel posts and panelling to original staircase.
- 748 High Road: hinged decorative panels found on all floors, main staircase with iron balustrade, green faience tiles, grate in first floor rear room, parquet flooring, mosaic flooring.
- 750 High Road: fireplaces, glazed tiles and chimneypieces from upper floor rooms.

8.5.5 No materials for salvage will be allowed to leave the buildings or site without a proper record kept of their destination.

The Proposals for Warmington House

8.5.6 Warmington House would be fully restored and converted to form part of the proposed Tottenham Experience Museum. This would be a multi-media museum which would illustrate the history of the football club and reflect the history and cultural heritage of Tottenham as a place. It would also provide a repository for the recording and archiving of lost and intangible heritage, providing a valuable and enduring community resource.
8.5.7 The works to Warmington House will be organised in ways which would, as far as practically possible, avoid using the significant retained interiors as circulation routes. Where retained fabric (out of necessity) has to be in the areas of any works, such as internal or external openings employed as doorways for circulation, these will be appropriately protected, as will such materials and artefacts in areas where works are being undertaken.

8.5.8 Before works commence in or around retained fabric or artefacts, these elements will be properly protected. Where otherwise retained fabric has to be dismantled, the work will be carried out by appropriate tradesmen who will also be responsible for its reinstatement. All fragile materials and artefacts retained on site will be protected during the works with appropriate hoardings or casings. Where elements have to be boxed in for protection, appropriate means of access for security checks will be incorporated.

8.5.9 Where necessary, vibration and movement monitoring would be undertaken in addition to the implementation of structural support mechanisms (Chapter 13: Noise & Vibration).

Protection of Neighbouring Buildings

8.5.10 Buildings proposed for retention, whether or not owned by the applicants, should be subject to detailed proposals for protection during the construction of the proposed works. Protection should include: physical protection against inadvertent or unauthorized access; manned security of unoccupied buildings including electronic surveillance and ‘Redcare’ links to a monitoring station; and occasional maintenance checks to ensure that roofs and rainwater goods are secure and effective.

8.6 Potential Environmental Impacts and Effects and Additional Mitigation, Compensation and Enhancement Measures

Introduction

8.6.1 The heritage assets impacted by the new development are described in section 8.3 and 8.4 above. The Project is described in Chapter 4 and in greater detail in the Design and Access Statement accompanying the application and are shown in the drawings by Populous, Allies and Morrison and Donald Insall Associates.

8.6.2 The Project includes the demolition of the current stadium and the three locally listed buildings at 746, 748 and 750 High Road and the construction of a new 61,000 seating capacity stadium; an adjoining 180 bedroom hotel at the junction between the High Road and Park Lane; an Extreme Sports centre and health centre east of the proposed hotel, and a museum and visitor centre, the Tottenham Experience, fronting the High Road at the south-western corner of the site. The proposed Tottenham Experience will replace the three locally listed buildings and incorporate Warmington House at 744 High Road within a new terrace, providing this redundant Building At Risk with a long-term viable use. Architects Donald Insall Associates have collaborated with Populous to provide the proposed drawings for the restoration and re-use of this Grade-II listed building.

8.6.3 The Project also includes an outline application for four new residential buildings situated at the south-eastern corner of the site these will range in from 16 to 32 storeys and accommodate 585 new homes.

8.6.4 The way the new stadium development would address the Conservation Area and in particular the High Road is considered to be a major improvement over the consented proposal which was considered to be...
acceptable by LBH in terms of its impact on heritage assets. The design principle to ensure the stadium would hold and define the linear nature of the historic street is reflected in the proposals with lower buildings to the west of the stadium forming an almost continuous terrace, including Warmington House, which would provide continuity for the historic areas to the north and south in a way the consented proposals never did. To the south the hotel tower would be employed to define the start of this rebuilt part of the historic route as a marker for those arriving from that direction, providing a gateway which channels views from the south. Overall the proposals for the High Road and the Conservation Area, as well as the setting of Warmington House would be a significant improvement over the consented scheme.

Potential Environmental Impacts and Effects on the North Tottenham Conservation Area and Associated Heritage Assets

The Stadium

8.6.5 The proposed stadium is described in full in the Design and Access Statement by Populous, the following provides a summary description with a focus on its visual relationship to the North Tottenham Conservation Area.

8.6.6 The proposed stadium is of a dramatic and striking design. It celebrates its positioning along the High Road, with a contemporary design that reflects the strong identity of THFC as one of the leading football clubs in Europe, while rooting the club in its local community. It also seeks to add colour and life to this part of the Borough and to reinvigorate the High Road and indeed the wider N17 area. In the same way that the stadium consented in 2011 would have, its construction will transform the character and appearance of this area of the Tottenham High Road, introducing a major new structure to the streetscape in the North Tottenham Conservation Area, significantly affecting both the scale and nature of development along the High Road in this location, but also with wider impacts in the areas which fringe the conservation area. Although of a similar scale, the design of the proposed stadium differs substantially from the consented stadium and incorporates the following beneficial changes:

- At lower level, it relates more appropriately to the rhythm of development along the High Road, introducing a more active street-level frontage.
- An asymmetrical design that is focused towards the Southern ‘home end’ as the heartbeat of the new stadium.
- A tighter atmospheric stadium bowl with a capacity of 61,000, as opposed to the consented capacity of 56,250, and the largest single tier in the UK, the home southern stand, increased to accommodate a crowd of 17,000.
- A fully retractable pitch – to cater for NFL, concerts and a range of other events whilst protecting the integrity of the playing surface.
- A sculpted appearance – wrapping and folding its way around the stadium before reaching the home end, where a glass façade arches upwards to reveal the magnificent single tier home stand.
- A new five-storey atrium space within the Home End of the stadium – that will gather and focus the home support before and after the match.
- A curved roof, which melds together with the stadium structure – completed by a lightweight cable-net roof to create a graceful and elegant clean cover over the seating bowl.
- A spectacular front door opening up onto the High Road – providing a glimpse of life within the stadium, designed to create a link and sense of arrival from the station and new Public Square being bought forward as part of regeneration to the West of the High Road.
- A prominent entrance for the East Stand onto Worcester Avenue – framing a double height banqueting hall
and revealing the Sky Lounge at high level.

- First class conference and banqueting facilities – to enable the Stadium to be active 365 days a year.
- An exceptional public square, of a considerably larger size than that of the consented stadium on the south podium next to the Home end of the Stadium. This would offer a range of community activity zones and space for fan-themed activities and would be accessed by a series of staircases from the High Road with external lift access also provided.
- A unique ‘Sky Walk’ – a visitor attraction for fans and the public alike, allowing people to climb the exterior of the building up to 40 metres high.

8.6.7 The sculpted appearance of the stadium envelope is formed by a layered façade, which wraps around the building to retain crowd noise and reduce the impact of events on the surrounding neighbourhood. It incorporates a sky walk into the leading edge of the roof, which will add drama and life to the façade. The proposed cladding of perforated-metal panels would have the beneficial impact of forming an attractive external elevation to the stadium, both in the day and at night when it would be partially back-lit, while also concealing external plant without the need for unattractive louvres.

8.6.8 The dynamic asymmetrical design is shaped to form a prow over the southern podium, providing shelter and shade to the spectators entering the main ‘home-end’ South Stand, the heart of the proposed stadium development. An arched glass façade would allow spectators to get a sense of the scale of the single-tier home stand as they approach it from the south podium. Areas of glazing, including glazed escalator and lift shaft enclosures are proposed in the western façade of the stadium to ensure visual interaction between the stadium interior and the street, contributing to the animation of the façade in street views.

8.6.9 The southern podium would be accessible via a series of external stairs. It would provide a significant public space for activities, as well as the amenity space for a series of residential blocks to be created south of the stadium set away from the eastern boundary of the North Tottenham Conservation Area which are described later in this chapter. It will incorporate a range of public facilities, including a multi-purpose play area; outdoor gym; outdoor café; water features; and soft landscaping that will create an attractive and welcoming public space. The multi-purpose play area will be heavily used by the THFC Foundation to host a range of community events and activities that will enable it to expand and develop its existing programme.

8.6.10 To the north of the stadium there would be another podium entrance on the High Road. The northern podium would be principally for match day circulation, but would give access to the Lilywhite House complex (the Northern Development) to the north. Both the northern and southern podiums would integrate into the surrounding streets with Worcester Avenue to the east and Park Lane to the south, as well as High Road. They are also intended to form a key part of the public circulation routes for the wider masterplan being developed by LBH and its partners, which runs all the way from White Hart Lane station through to Tottenham Hale.

8.6.11 As dictated by its function, the proposed stadium is of a substantial scale that would contrast dramatically with the predominantly three and four storey nearby historic buildings. It is, however, comparable in bulk and mass to the consented stadium, rising to 58.784 meters AOD in comparison to the consented of 53.054 meters AOD and with a total area of 119,945 sqm in comparison to the consented stadium which is of 85,110 sqm.
8.6.12 The design of the stadium has been carefully considered to ensure that it would address the High Road more successfully than the consented stadium. In line with this, the stadium footprint has evolved from the oval shape of the consented scheme, which left fragments of negative space along the length of the High Road, to a form which expands to meet and positively reinforce the pattern of the surrounding urban fabric. The revised design would also provide a more active street frontage, ensuring that the building has ground level activity and engages with the public realm 365 days a year. These active areas would comprise the following:

- The Tottenham Experience with Warmington House at its heart – this would provide a range of commercial, leisure and learning uses that will encourage significant footfall on a daily basis and is described in more detail below;
- The West Stand entrance – this would sit proud from the rest of the building, providing a front door to the stadium that respects the scale and alignment of the neighbouring High Road properties. It would also be aligned with the area of the proposed public square and White Hart Lane station entrance that will form part of the ‘High Road West’ regeneration;
- The players’ entrance;
- Hospitality/conference entrances – these would be used on both match days and on non-match days for corporate events;
- VIP entrance;
- Wheelchair users’ entrance; and
- Media Café – a public café located just to the south of Dial House, providing a smaller-scale entrance from the High Road more in keeping with the scale of the adjoining listed terrace. This would provide a new amenity for nearby residents.

8.6.13 The proposals also include the introduction of coherent areas of public realm along the High Road. At the south west corner, the intersection at the ‘main’ entrance adjoining the southern end of the proposed Tottenham Experience, would comprise a landscaped public space with high-quality paving and street furniture. This high-quality landscaping would also continue to the north along the High Road, defining and emphasising the linearity of the street, and to the east along Park Lane, enhancing the setting of the conservation area and of the late-19th-century terraced buildings on the southern side of this road.

8.6.14 Applying the methodology in Table 8.1, the proposals would improve the character of the conservation area and the setting of listed buildings. The impact of the proposed stadium on the North Tottenham Conservation Area is therefore considered to be:

- Construction Phase: Moderate Beneficial
- Operational Phase: Moderate Beneficial

8.6.15 The operational phase of the proposed scheme if assessed against the ‘baseline’ of the consented scheme would also be moderate beneficial. This is because the relationship of the proposed Stadium with the High Road, both in terms of design and in terms of providing an active street frontage, is much improved in comparison to the consented scheme.

**The Demolition and Replacement of the Locally Listed Buildings at 746, 748 and 750 High Road**

8.6.16 In addition to the current stadium on the application site, it is proposed to demolish the former Tottenham and Edmonton Dispensary (746 High Road) the Red House (748 High Road) and the White Hart Public
House (750 High Road). The demolition of these three locally listed buildings is proposed in order to address two key issues: crowd safety and townscape. These are explained in turn below.

8.6.17 On match days the current stadium (capacity of approximately 36,000) suffers from crowd safety issues caused by the 1.9m pinch point on the High Road pavement in front of No. 750 High Road. Combined with the adjoining two properties at Nos. 746 and 748 High Road, this group of buildings results in a narrow pavement, forcing pedestrians to walk within the adjoining bus lane whilst it is in operation.

8.6.18 The consented scheme, which retained Nos. 746-750 High Road, sought to address this crowd flow issue through the creation of a new pedestrian walkway that would funnel pedestrians from the High Road around the rear of the retained buildings and back on to the High Road. Advice to THFC from pedestrian movement experts, Movement Strategies, has confirmed that in reality, the vast majority of pedestrians on match/event days would not follow the new pedestrian route around the back of the buildings, but would instead continue along the main High Road pavement, resulting in significant crowd safety issues at this pinch point. This problem will be significantly exacerbated with the new stadium increasing the capacity and number of spectators / pedestrians from the current 36,000 seats to the consented 56,000 seats.

8.6.19 By demolishing and replacing the locally listed buildings, the proposed scheme would allow the creation of a minimum pavement width of 9m along the High Road; this would enable the safe and smooth movement of spectators in two directions, without being forced into the roadway or encountering obstruction along the way. The crowd safety issues are explained in full in the accompanying report by Movement Strategies.

8.6.20 The proposed demolition and replacement of 746-750 High Road would also have a positive impact in townscape terms. Replacing the buildings with the proposed Tottenham Experience, described in detail in below, would allow a more holistic approach to the design of the stadium development, transforming the way in which it will address and connect with the High Road and resulting in an overall enhancement of the character of the conservation area and the setting of Warmington House.

8.6.21 Although, on balance, the locally listed buildings make a positive contribution to the conservation area, their setting is already compromised and, unlike Warmington House, they cannot be reconciled with the much larger scale stadium behind through the recreation of a terrace, by virtue of their differing form and location on the High Road.

8.6.22 In summary, with the conservation area being fundamentally altered to accommodate the new stadium, their setting would become incongruous and indeed their retention would compromise the setting of the new stadium. The consented scheme did not provide a satisfactory solution to this fundamental townscape issue, as clearly demonstrated in the visualisations which show that, due to the agreed provisions for crowd flow around the buildings, they would appear as a remnant of historic townscape with no meaningful visual or physical relationship to the new development around them or to the wider conservation area.

8.6.23 The significance of the locally listed building would be partially retained by salvaging artefacts and elements of the building for relocation and/or reuse within the proposed The Tottenham Experience Museum. This would include the shop front of the ‘Tottenham and Edmonton Dispensary’ and Bill Nicholson’s panelled office in the Red House. It would possibly also include elements of the façade of the
Red House, such as the bay window, which although a later addition of no architectural value, has played in the history of the Club and the community by providing the platform to the now removed Tottenham Hostpur clock. Some of these elements would be located in the proposed atrium to the rear of Warmington House. The local historic significance of the buildings would also be recorded in the form of virtual interactive exhibits in the proposed museum.

8.6.24 While the demolition of the locally listed buildings would result in some harm to the significance of the North Tottenham Conservation Area, it is considered that this harm would be ‘less than substantial’ and would be substantially outweighed by the overall benefits of the proposals as set out in the Planning Statement by DP9 that forms part of the Project application. The proposed design of the Tottenham Experience will enhance the character and appearance of the conservation area and provide a much better solution than the consented scheme; the potential positive impact of this proposed building is described in detail below.

8.6.25 Applying the methodology in Table 8.1 the impact of the proposed demolition of 746, 748 and 750 High Road would result in the total loss of non-designated heritage assets in a conservation area, while the proposed Tottenham Experience building would improve the character of the conservation area and setting of the Grade-II listed Warmington House. The impact on the significance of the North Tottenham Conservation Area is considered to:

- Construction Phase: **Moderate Adverse**
- Operational Phase: **Moderate Beneficial**

8.6.26 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **moderate beneficial**. Although the consented scheme included the retention and refurbishment of the locally listed buildings, it did not provide a resolution to the crowd flow issues and left the locally listed buildings without a coherent setting that would not contribute positively to the character and appearance of the conservation area or the setting of the Grade-II listed Warmington House.

**The Tottenham Experience and Restoration of Warmington House**

8.6.27 The proposed design of the south-western corner ‘gateway’ to the stadium is of high importance due to the majority of spectators arriving from the south (from Seven Sisters and Tottenham Hale Stations). The proposed Tottenham Experience building would form a vital part of this southern ‘gateway’, contributing towards remedying the sub-optimal design solution for this corner that arose following the imposition of a planning condition on the consented stadium.

8.6.28 The Tottenham Experience building, together with the proposed stadium, would reinforce the High Road building line in the form of a new two-storey terrace flanking the retained and fully restored Grade-II listed Warmington House. The principle of its design concept is to integrate Warmington House within a new terrace that reflects the scale and massing of the listed building but, rather than seeking to replicate the early-19th-century architecture of Warmington House, would be of a high quality and contemporary design that responds to the character of the new stadium.

8.6.29 In addition to the positive holistic impact of its proposed design on the character of the High Road and setting Warmington House, the Tottenham Experience building would improve permeability and access between the High Road and the south podium and improve accessibility to the podium, providing a significant public benefit.
8.6.30 The building would be shaped and angled to retain some of the variety in the building line and roofscape that is currently provided by the three locally listed buildings, while creating a stronger building line overall. Although reading as a complete terrace in longer street views, it would be divided into two principal sections by a staircase providing access to the south podium. This access would be one of three, with wider entrance steps positioned at either end of the Tottenham Experience building, adding to the permeability between the podium and the High Road. The first-floor level of the proposed building would open directly onto the south podium adding to the beneficial improved circulation in this area of the stadium development.

8.6.31 The northern range would rise from two to three-storeys and would accommodate retail space on the ground floor. The northern tip of this range would flank and enclose steps up to the south podium and would also incorporate the vehicular access to the proposed underground car park. The vehicular access doors would be clad in the same material as the rest of the building to minimise their visual impact. The first floor of the northern range would be linked to the south podium level and would accommodate the facilities for the proposed skywalk. There would be access to its roof from the south podium via rear external steps from which the proposed skywalk will begin.

8.6.32 Warmington House and the southern range of the Tottenham Experience would accommodate the proposed Tottenham Experience Museum. To be designed by Mather and Co. in consultation with the Bruce Castle Museum, this would provide a repository for the recording and archiving of lost and intangible heritage, providing a valuable and enduring community resource. It would be a multi-media museum that, in common with other such establishments at places like Old Trafford (Manchester United) and the Emirates (Arsenal), would not just encapsulate and illustrate the history of the football club, but also reflect the history and cultural heritage of Tottenham as a place. As such, it will be a Tottenham museum, not simply a THFC museum.

8.6.33 The proposed southern range of the Tottenham Experience building would also house a café on the first floor with access to the south podium and a retail space on the ground floor, south of Warmington House. A fully-glazed entrance pavilion would be located at the southern end of the building. This element of the building is inspired by the sleek entrance to the New York Apple store, and would provide a welcoming, obvious entrance to the building for visitors approaching from the south.

8.6.34 The materials of the new building would comprise a mixture of cast-iron panelling and glazing, with the proposed glazed shop fronts and ground-floor frontage to the museum aligning with the ground floor level of Warmington House. The cast-iron panelling to the upper storeys would be patterned to lighten its appearance and its soft brown colouring would complement the brickwork of the upper storeys to Warmington House. Cast-iron-clad pilasters on the ground floor and narrow glazed openings on the first floor would provide breaks at each level. These would be positioned to reflect the bay widths of Warmington House to present a sense of continuity in the rhythm of the frontage.

8.6.35 In order to ensure that the proposed new terrace would not visually dominate Warmington House, the height of the proposed flanking ranges would not rise above the parapet height of the listed building. Glazed links would be included between the proposed cast-iron-clad ranges and Warmington House, retaining a visual separation between the historic and new fabric.

8.6.36 The external elevations of Warmington House would be fully restored with the original character of the front and rear elevations reinstated by the removal of detracting later additions and reinstatement of lost
features. On the front elevation this would include: the restoration of historic patterned sash windows, the reinstatement of missing stucco moulded window and door cases and restoration of the main cornice, and at the rear a modern fire escape and associated second-floor fire door would be removed and a multi-pane sash reinstated. An open glazed atrium at the rear of the listed building would allow it to link to other elements of the proposals, placing it at the heart of the proposals and contributing towards its long-term viable use. This would be accessible via an existing large opening in the ground-floor rear elevation.

8.6.37 The proposals would include the full sympathetic conversion of the interior of Warmington House providing it with a long-term viable use as a high quality interactive heritage museum celebrating the history of the Club and the area of Tottenham. The original internal plan form of the building would be retained, with the rooms on the lower floors lending themselves to individual exhibit spaces. The more compromised and less accessible spaces at second floor level would be used for ancillary space and administration offices, which would not be accessible to the public. Two new jib door openings would be created in the first-floor party walls of Warmington House to link the building with the proposed new building either side, and in turn with the associated rear access doors to the south podium. The necessary openings would be located discreetly on the eastern side of the chimney breasts in the two front first-floor rooms.

8.6.38 The proposal to incorporate Warmington House into a new terrace has been informed by historic research, outlined in full in Section 2 of the Heritage Statement by Donald Insall Associates, included in Appendix 8.1.

8.6.39 The recent demolitions combined with the total loss of the historic front and rear garden have left the building with a setting that makes no contribution to the special architectural and historic value of Warmington House as a Grade-II listed building. Warmington House has formed part of a terrace for the majority of its life, and the northern elevation of the listed building has, since at least the late-19th-century, been concealed in views from the High Road by neighbouring structures. It is therefore considered that sympathetically incorporating Warmington House into a new terraced form would be an acceptable way in which to enhance its setting and breathe new life into the listed building.

8.6.40 Applying the methodology in Table 8.1, the proposed restoration of Warmington House would ensure the long-term future of this designated heritage asset, providing the building with a viable use and repairing the significant fabric of the building. The proposed Tottenham Experience building would improve the character of the conservation area and setting of the listed building. This impact is therefore considered to be:

- **Construction Phase:** Major Beneficial
- **Operational Phase:** Major Beneficial

8.6.41 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be major beneficial as the consented scheme would not provide Warmington House with an optimum viable use that would successfully integrate the building into the overall stadium development. The proposed design and uses of the Tottenham Experience building would also be a major benefit over the consented scheme, enhancing the character of the conservation area and providing Warmington House with a better setting than the consented scheme.
Hotel

8.6.42 The proposed 180-bedroom hotel tower at the southern boundary of the site would be a significant new element in the townscape that will enhance the North Tottenham Conservation Area and wider area, providing a landmark both for the southern entrance to the stadium and to this part of the historic High Road heading north from London. In views north along the High Road its narrow southern end would form an elegant marker, forming a pleasing contrast between its vertical line and the horizontal emphasis of the proposed stadium.

8.6.43 In views from the northern end of the North Tottenham Conservation Area the hotel would be largely concealed by the proposed stadium and would therefore have a neutral impact on the character of the conservation area and on the setting of the heritage assets in this area, including the Northern Terrace.

8.6.44 Although positioned closer to the High Road and the boundary of the North Tottenham Conservation Area, the hotel would only affect the immediate setting of Warmington House at 744 High Road. The other nearby listed buildings, such as the Grade-II listed early-19th-century Moselle House are positioned within their own clearly defined and enclosed plots set back from the pavement line of the High Road. Therefore, although the hotel would clearly be visible within the wider setting of these listed buildings, it would not have a negative impact on their significance.

8.6.45 Despite the obvious difference in scale between the proposed hotel and Warmington House, the hotel would not harm the significance of the listed building because, as described above, its setting has been entirely altered and has no remaining intrinsic significance. The proposed Tottenham Experience buildings would provide Warmington House with a new coherent setting, inspired by the historic terraced form of the listed building, that would both enhance the setting of the listed building and help to visually integrate it with the new design of the larger-scale stadium and hotel.

8.6.46 The hotel has been designed by Populous (the stadium architects) to complement the design of the stadium, and also to follow the angle of the building line further south along the High Road so that in longer views it reinforces the directionality of the building line. Its cladding would be similar to that of the stadium comprising glazed and perforated metal panels positioned to form a striking diagonal line across its western elevation. The ground floor of the hotel would adjoin the southern steps to the south podium making the hotel a striking marker at this main southern entrance to the stadium development.

8.6.47 Applying the methodology in Table 8.1, the proposed hotel building would improve the setting of the North Tottenham Conservation Area and its impact is considered to be:

- Construction Phase: Negligible
- Operational Phase: Minor Beneficial

8.6.48 The operational phase of the proposed hotel, if assessed against the baseline of the consented scheme would also be minor beneficial as the consented scheme did not include the introduction of a landmark tall building adjoining the High Road that would complement the design of the stadium and reinforce the building line consequently enhancing the character of the conservation area.

Residential Development

8.6.49 The proposed residential blocks designed by Allies and Morrison, for which an outline permission is
sought, would form a cluster of taller buildings to the southeast of the site. They would create a new residential quarter in North Tottenham providing 585 much needed high-quality new homes in comparison to the 285 homes provided by the consented application. These new homes would help to deliver the ambitious housing growth targets for the area set by the London Borough of Haringey and the GLA. Importantly, it would provide a positive step change in the housing offer in Tottenham, helping to strengthen the socio-economic demographic profile and create a more mixed and balanced community.

8.6.50 Sitting within this Southern Residential ‘quarter’ within the podium will be a range of uses, including commercial space, which will provide employment opportunities and more animated street frontages. A three-storey building in the north-east corner of the site is also intended to provide a potential new health centre. A key priority for LBH is to tackle the poor quality of health amongst many of the residents in Tottenham, by increasing access to high quality health care provision. The proposed health centre will provide a significant tangible public benefit, and would help to serve the existing residents as well as the residents of the additional new homes delivered through the delivery of LBH’s masterplans.

8.6.51 The materials of the proposed towers are subject to reserved matters, however a design code is in place which will be complied with to ensure a high quality design. The cladding will comprise masonry materials such as brick, terracotta or concrete. The towers would share a common materiality so that they are perceived as a group with a coherent inter-relationship. They would be visible in the wider townscape from all sides so each elevation is treated as a primary elevation of equal design quality. The base of each tower has a chamfered form, allowing a two-meter cantilever beyond the plinth. This chamfered form is repeated at the top storeys of each tower to create elegantly sculpted penthouse floors and a communal rooftop terrace set within an open structural framework. The latter is intended to give the top of the towers a lightweight form and mitigates their visual impact in views across the North Tottenham Conservation Area and wider area. The white frame to each tower forms a ‘giant order’ organized in a three to five storey high grid and arranged in bay widths based upon the structural and special layouts of the flats. In order to add continuity and consistency to the character of the buildings, the mid part of the buildings would be calm and repetitive, defined by the vertically proportioned elements within each four-storey height masonry grid.

8.6.52 The impact of the proposed residential towers on the character and appearance of the North Tottenham Conservation Area would be limited by their set-back location at the eastern end of Park Lane. In views south along the High Road in the North Tottenham Conservation Area all but the very top of the tallest tower would be concealed from view by the proposed stadium. Their impact on the character of the conservation area and setting of listed buildings in these views would generally be neutral. The towers would be partially visible in views north along the High Road above the buildings flanking the eastern side of the High Road. Their visual impact in these views would, however, be mitigated by their design including the light-coloured cladding materials and the chamfered ‘lightweight’ appearance of the upper storeys.

8.6.53 Applying the methodology in Table 8.1, taking into account the visibility of the towers in views across the North Tottenham Conservation Area and the way in which the design of the towers would mitigate their overall impact, the impact of the proposed residential development on the setting of the North Tottenham Conservation Area is considered to be:

- Construction Phase: Negligible
- Operational Phase: Negligible
8.6.54 The operational phase of the proposals, if assessed against the baseline of the consented scheme would arguably be negligible as although the consented scheme did not include the introduction of a cluster of tall towers in this location, the impact of the towers would be mitigated as described above.

**The Extreme Sports Centre**

8.6.55 Associated with the focus on improving the health and well-being of the local community, an innovative Extreme Sports Centre is also proposed that will house the largest indoor climbing wall in Europe. It will be sited between the new hotel and the residential cluster. The centre will build on the sporting legacy of the Club’s longstanding presence in this location, and would ensure that the scheme provides access to sport every day of the week.

8.6.56 The proposed building, designed by Populous, has a dynamic form in keeping with its proposed use. Its upper storey would be angled away from Park Lane so that it rises in height towards the stadium. The proposed materials would be simple with light and dark cladding between diagonally orientated glazing that would add to the interesting form of the elevations.

8.6.57 The angled top section of the Extreme Sports Centre would be partially visible in views north-east from the High Road over the locally listed terraced buildings between Bromley Road and Argyle Passage. It would also be visible in views further south along the High Road across the Grade-II listed Whitbread gate building and would arguably have a minor adverse impact on the wider setting of this listed building in this view (see assessment of View 34 below). However, like the residential towers, the Sports Centre would be set back some distance from the boundary of the North Tottenham Conservation Area along Park Lane. This, combined with its relatively low height would mean that its overall impact on the setting of the conservation area and setting of other heritage assets would be neutral.

8.6.58 Applying the methodology in 8.1, taking into account the limited visibility of the extreme sports centre in views across the conservation area, its impact is considered to be:

- **Construction Phase:** Negligible
- **Operational Phase:** Negligible

8.6.59 The operational phase of the proposals, if assessed against the baseline of the consented scheme would also be negligible.

**Northern Terrace**

8.6.60 The proposals do not include any changes to the fabric or the immediate setting of the Northern Terrace.

8.6.61 Clearly the proposed stadium development will have a major impact on the wider setting of the listed terrace, being prominent in views towards the terrace from the northern end of the High Road. These views would, however, also be substantially altered by the consented stadium proposals. It is considered that the overall design of the proposed stadium in these views would represent an improvement over the consented scheme. This applies in particular to the setting of Dial House which, rather than standing adjacent to an area of negative space as proposed in the consented scheme, would adjoin the proposed media cafe which would better complement the scale and building line of the terrace. Furthermore the proposed Stadium and the associated development would see a marked improvement of the setting and
public realm of the Northern Terrace which would in turn ensure the ongoing conservation and viability of the buildings.

8.6.62 Applying the methodology in Table 8.1, the proposed stadium development would enhance the setting of the Northern Terrace and its impact on the terrace is considered to be:

- Construction phase: Negligible
- Operational phase: Minor Beneficial

8.6.63 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be minor beneficial. The proposed scheme, as described above, would provide an improved wider setting to the Northern Terrace and in particular Dial House.

North Tottenham Conservation Area: Views Assessment

8.6.64 The visual impact of the Project on the setting of the identified heritage assets in views across the North Tottenham Conservation Area has also been assessed using verified views produced by INK Associates that are included in the application at Appendix 12.5.

View 15: West side of the High Road at the junction with Lordship Lane

8.6.65 This view is taken from the southern end of the North Tottenham Conservation Area. The view is framed by two prominent corner buildings: on the western corner of the High Road with Lordship Lane the Grade II listed No. 639 High Road, now the 639 Enterprise Centre, is a neo-Jacobean style red brick building with a corner octagonal turret with a copper dome and scrolled and shaped gables to the High Road. Built in 1901 as the offices of Tottenham and Edmonton Gas Company by John Sherwell Corder, No.639 was extended in 1914. On the east side of the High Road on the corner of Lansdowne Road is the prominent square corner tower of Nos. 636 & 638, a locally listed, three storey, Art Deco style department store that was originally built in 1930 for the London Cooperative Society. This building was gutted by fire during the riots in 2011 and has since been fully restored. Beyond No. 639 High Road the western side of the High Road is concealed from view. The eastern side continues at the same scale with two late 20th century buildings of no architectural interest. Beyond this two large trees frame the High Road as it continues northwards.

8.6.66 The curved form of the stadium would terminate the view north along the High Road. The slender hotel tower would rise behind the trees at the centre of the view but would be largely obscured during the summer months, while the angled form of the upper storeys of the Extreme Sports Centre would be entirely obscured during the summer months. To the east the tapered top storey of the tallest residential tower would be seen. Although the mass and scale of the proposals would have an impact on the view, the Project would have a minor beneficial impact on the conservation area as a whole, with the stadium and hotel acting as a positive landmark at the centre of the view.

- Construction phase: Negligible
- Operational phase: Minor Beneficial

8.6.67 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would be minor beneficial as the proposed hotel and stadium would be of a better design than the consented scheme, with the hotel providing a positive landmark along the High Road.
**View 16: West side of the High Road opposite the junction with Northumberland Park**

8.6.68 This view is located at the northern end of the North Tottenham Conservation Area. On the east side of the High Road in this view are the group of buildings at the north-western corner of the Project site that are collectively known as the ‘Northern Terrace’. In the forefront of the view to the east is 814 High Road, a locally listed former bank constructed in 1905. Beyond this building the early 18th century Grade II* listed buildings at 808-810 High Road are set back from the High Road behind railing enclosed front areas. The building line steps forward once more at 804-806 High Road, the blank flank wall of the unlisted late 19th century terrace, creating a rather jarring effect to the continuity of the street line from this viewpoint, before stepping back once more to the Northumberland Terrace, a continuous row of early 18th century listed buildings that terminates at the Grade II* Dial House. The development to the west side of the High Road in this view has a more continuous building line of two to three storey terraces with low quality shop fronts.

8.6.69 The new stadium would rise behind the buildings to the east side of the High Road. There would clearly be a substantial contrast in scale between the stadium and the Northern Terrace but in the foreground of this view the height of the stadium would not exceed the height of the brick chimneys to the Grade II* listed 808-810 High Road leaving these in silhouette against the sky. The design and materials of the stadium, including its perforated metal clad skin would be in stark contrast to the brick terraced buildings lining the High Road. The stadium would be a landmark building in this view, its simple materials and curved form adding a new dimension to the character of the conservation area and ensuring that, although clearly visible and large scale, the stadium would not detract from the strong rhythm of bays and roofline of the Northern Terrace.

8.6.70 In this view the proposed residential towers and hotel building would be largely concealed with very top of the hotel and the upper floors of the tallest tower only just visible above the stadium roofline. The grid like form of the top of the residential tower would allow light through this structure giving it a lightweight appearance.

- Construction phase: **Negligible**
- Operational phase: **Minor Beneficial**

8.6.71 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial** as the proposed scheme provides a much improved relationship with the Northern Terrace, particularly Dial House at790 High Road.

**View 23: West side of the High Road, at junction with Cedar Road**

8.6.72 This view is taken from towards the southern end of the North Tottenham Conservation Area. This part of the High Road is characterised largely by mid-late 19th century development. On the western side of the High Road are the locally listed Nos. 665-683 (odd) High Road which form a terrace of mid-late 19th century red brick buildings of four storeys with projecting single storey shop units on the ground floor. On the east side of the High Road, partially visible in the immediate foreground, is the Grade II listed gate building for the former Whitbread Brewery at 676 High Road. The development continuing northwards along the High Road beyond the Whitbread gates is characterised by 20th century buildings with slightly larger plots interspersed with earlier 19th century development, including Nos. 684, 684a & 684b and 686 to 690, all of which are locally listed.
The proposals would see the curved form of the stadium terminating the view north along the High Road, the arched southern ‘home’ end extending above the terraced buildings in the far distance. The slender form of the hotel would rise in front of the stadium, its lower floors and base concealed behind the terraced buildings on the east side of the High Road, and together the stadium and hotel would form a positive landmark development. The angled upper storeys of the Extreme Sports Centre would also be visible immediately to the east of the hotel but would not be prominent in this view. Further to the east the four residential towers would also be visible, the stepped height of the grouped towers combined with the form of the upper floors, comprising a chamfered grid left open to the sky, would allow visual permeability through the upper sections and reduce the overall mass and bulk of the towers in this view. Although the mass and scale of the proposals would have an impact on the view, the Project would have a minor beneficial impact on the conservation area as a whole, with the stadium and hotel acting as a positive landmark at the centre of the view.

- Construction phase: Negligible
- Operational phase: Minor Beneficial

The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be minor beneficial as the design of the proposed scheme is an improvement on that consented.

View 26: White Hart Lane

This view is situated close to White Hart Lane Station on White Hart Lane which forms the most westerly boundary of the North Tottenham Conservation Area. The majority of the view takes in the buildings of the Love Lane Estate. These comprise, to the immediate right of the view, Charles House, a late 20th century ten storey tower with a T shaped plan. Adjoining this to the centre of the view (due to the curve of the road) there is more of the estate’s residential housing of a smaller scale, rising to four storeys, and stretching to the south. These buildings are set back from White Hart Lane within grassed areas planted with trees, and enclosed by railings to the pavement. The foreground of the view comprises the road itself and the pavement either side, which is in poor condition. Immediately to the left of the view is one of the entrances to the Peacock Industrial Estate. Beyond, set back from White Hart Lane behind a low brick wall with railings and concealed from view, is the Grade-II listed building known as The Grange at 32, 34 and 34a White Hart Lane. The Grange is a mid-18th century building with additions dating to the early 19th century.

The curved form of the stadium would be seen in much of this view, rising behind the four storey residential development on the Love Lane Estate. Further to the south the edge of the hotel would just be visible adjoining Charles House and, from this angle, the 32 storey residential tower would appear to rise to the same height as the hotel. The lower towers of the southern residential development would only be partially visible above the roofline of the stadium and in the summer the trees in the middle distance of this view, would conceal all of the towers and much of the stadium. Overall the proposed development would have a positive impact on the character and appearance of the conservation area by introducing high-quality architecture in this view that, although large scale, would be a positive landmark on the High Road. It would have no direct impact on the immediate setting of the listed buildings comprising The Grange (32-34a White Hart Lane) which, as described above, are set back from the road within an enclosed forecourt.
The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial** as the design of the proposed scheme is an improvement on that consented.

**View 27: West side of the High Road, at the junction with White Hart Lane**

This view is located at the junction between the High Road and White Hart Lane at the northern end of the North Tottenham Conservation Area. This view is only a wireline but a rendered view has been produced for the night time version of this view. On the east side of the High Road in this view are Nos. 790-796 High Road, comprising the Grade-II* listed Percy House (796) and Dial House (790) and Grade-II listed 792 and 794 High Road. These buildings, forming part of the group of buildings at the north-western corner of the application site that are collectively known as the ‘Northern Terrace’, are set back from the High Road behind railing-enclosed front areas, the striking gate posts and boundary wall to Percy House being separately listed. At the centre of the view is Dial House which is the oldest building in the Northern Terrace, dates to the late 17th century and incorporating parts of an earlier 17th century building. South of Dial House the stadium development site comprises a large gap in the street scene and this, together with the exposed northern return elevation of 750 High Road further south, detracts from the character and appearance of the conservation area.

Apart from the Northern Terrace, this view is dominated by the High Road itself which is almost always busy with traffic. The west side of the High Road is largely concealed in this view, characterised by a terrace of three storey 19th century buildings with commercial uses at ground floor level. Traffic lights, safety bollards and a bus shelter clutter the view, while a couple of street trees provide some welcome greenery.

The new stadium would rise behind the Northern Terrace infilling the current gap in the building line on the east side of the High Road immediately south of Dial House. There would clearly be a substantial contrast in scale and materials between the stadium and the Northern Terrace, but the metal clad stadium would be a landmark building in this view, its simple materials and curved form adding a new dimension to the character of the conservation area and ensuring that, although clearly visible and large scale, it would not detract from the strong rhythm of bays and roofline of the Northern Terrace.

As explained above, the proposed multiple entrances and areas of glazing at lower level on the western stadium elevation, including the glazed escalator enclosure, would create visual interaction between the stadium interior and the street and introduce an active street-level frontage. Dial House would adjoin the proposed media café, which would project forward from the stadium at ground-floor level and complement the scale and building line of the ground floor level of the Northern terrace.

The proposed enhancements to the public realm along the High Road frontage, including the addition of street trees in front of the stadium, would also substantially enhance the streetscape in this view and, overall, it is considered that the proposals would have a minor beneficial impact on the character and appearance of the conservation area and setting of the listed Northern Terrace.

**Construction phase: Negligible**

**Operational phase: Minor Beneficial**
8.6.83 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial** as the proposed scheme provides a better quality stadium design and a much improved visual relationship between the stadium development and the High Road and the Northern Terrace, particularly Dial House.

**View 31: South side of Church Road, looking northeast**

8.6.84 This view is taken from the western boundary of the North Tottenham Conservation Area adjoining the northern boundary wall to Moselle House. Church Road is a secondary road adjoining the High Road at its southern end. The road is well screened by mature trees; to the north of the viewpoint is an open hard landscaped car park and school playground and further east, to the south of Church Road, an area of open green with trees with two early 19th century buildings set back from the road. 707 High Road (Moselle House) is Grade-II listed and 705 High Road is a locally listed building. Views of these buildings are largely obscured from Church Road and the High Road by the trees and their set back position. Looking east the existing stadium and the south stand are visible with the THFC merchandise shop in the foreground. To the northeast, between the trees, the front façade and the return blind façade of the former Tottenham and Edmonton Dispensary (746 High Road) can be seen, with the upper levels of the stadium rising behind.

8.6.85 The curved western façade of the stadium and its southern prow over the south podium, the main ‘home-end’ South Stand, would be prominent above the tree line in this view, with glimpsed views of the Tottenham Experience building possible between the trees. Adjoining the stadium in the middle of the view rises the western façade of the hotel which has been designed by Populous to complement the design and materials of the stadium, and also to follow the angle of the building line further south along the High Road so that in longer views it reinforces the directionality of the building line. The high-quality design of the proposed development in addition to the way in which it would reinforce the line of the High Road would ensure that it has a positive impact on the character of the conservation area in this view. The proposals would have a negligible impact on the immediate setting of the listed Moselle House and adjacent locally listed 705 High Road which is very clearly defined by the boundary wall to Church Road and the concealed green behind it.

- Construction phase: **Negligible**
- Operational phase: **Minor Beneficial**

8.6.86 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be **minor beneficial** as the design of the proposed scheme is an improvement on that consented and provides a better relationship between the stadium development and the High Road.

**View 32: West side of the High Road, at the junction with Ruskin Road**

8.6.87 This view is taken towards the southern end of the North Tottenham Conservation Area. On the western side of the High Road, in the immediate forefront of the view is the locally listed Nos. 685 – 689, three mid-late-19th century red brick buildings of four storeys with projecting single storey ground floor shop units, which form part of the same development as Nos. 665-683 (odd) seen in View 23 and continue the same building line. Beyond this terrace, the Grade-II listed buildings at Nos.695-697 are set back from the High Road behind a courtyard enclosed by a boundary wall and railings and are therefore concealed from view. Nos. 695-697, comprise a large pair of three storey early 19th century villas that are now in office.
use. Beyond these buildings is the locally listed Baptist Hall and The Tottenham Baptist Chapel, a classical Grade II listed building constructed in 1825. The Baptist Chapel is also set back from the High Road with railings to the street and some green planting in its forecourt, and as such is concealed from view, while the Baptist Hall is positioned away from the High Road to the rear of the Chapel. The large trees within the open green space fronting the sports centre form the terminus to the built form along the west side of the High Road in this view.

8.6.88 The buildings on the east side of the High Road in the forefront of the view are Nos. 686 to 690 (even), a terrace of three late-19th century buildings with bay windows at first-floor level and later projecting shopfronts with modern signage. Nos. 694-692 adjacent to the north are also of three storeys and originally part of the same terrace, however the cornice and parapet to the buildings has been lost and the facades rendered. The terrace continues in the middle distance with the locally listed 700, 704 & 706 High Road, also 19th century buildings with later projecting shopfronts, and beyond these are a cluster of street trees.

8.6.89 The proposals would see the curved form of the stadium terminating the view north along the High Road. The slender hotel tower would rise in front of the stadium, its lower floors and base concealed behind the terraced buildings on the east side of the High Road, and together the stadium and hotel would form a positive landmark development. The angled upper storeys of the Extreme Sports Centre would also be visible immediately to the east of the hotel but would not be prominent in this view. Further east, two of the four residential towers would rise above the roofline of the late-19th century terrace on the east side of the High Road. The stepped height of the towers combined with the form of the upper floors, comprising a chamfered grid left open to the sky, would allow visual permeability through the upper sections and reduce the overall mass and bulk of the towers in this view. Although the mass and scale of the proposals would have an impact on the view, the Project would have a minor beneficial impact on the conservation area as a whole, with the stadium and hotel acting as a positive landmark at the centre of the view.

- Construction phase: Negligible
- Operational phase: Minor Beneficial

8.6.90 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be minor beneficial as the design of the proposed scheme is an improvement on that consented.

**View 33: West side of the High Road opposite, and just north of junction with Bromley Road**

8.6.91 This view is taken from the southern end of the North Tottenham Conservation Area looking north. The buildings on the west side of the High Road in this view are screened by an almost continuous row of trees. These trees and the open green area behind them add a welcome punctuation along an otherwise urban road. Hidden from view beyond the trees are 707 High Road, otherwise known as Moselle House, a Grade II listed building dating from the early 19th century, and 705 High Road, a locally listed building also dating from the early 19th century. To the south of these buildings is 701-703 High Road, a mid-20th century Community Sports Centre, also set back behind the open green.

8.6.92 The centre of the view is dominated by the High Road itself, with pavements either side. On the east side of the High Road to the far right of the view is Coombes House, a low quality post-war apartment block. North of this building the pavement widens and the terraced row of buildings immediately south of the Project site are set back from the High Road on a diagonal line. These comprise a three storey red brick
public house (formerly the Bell and Hare, now No.8) dating to the interwar period; a three storey 20th century building and, on the corner of Park Lane, a two storey mid-19th century building. On the opposite corner of Park Lane is a temporary Tottenham Hotspur ticket office and merchandise shop which detracts from the streetscape. Beyond this the Grade-II listed Warmington House is partially visible, its chimney stacks rising above a large tree located in the foreground and to the pavement. The adjoining Tottenham and Edmonton Dispensary is positioned much closer to the High Road so that in the middle distance of the view its blank return wall is prominent, with the eaves and front elevation of The Red House visible just beyond.

8.6.93 The hotel and stadium would be the most prominent elements in this view, with the dynamic prow over the southern podium, the main ‘home-end’ South Stand and heart of the proposed stadium development, and the elegant hotel tower forming a striking focal point. The arched glass façade within the stadium south stand would allow a sense of the scale of the single-tier home stand as it is approached from the south and give views directly through the stadium bowl to the sky beyond. The hotel would tower above the three-storey buildings on the eastern side of the High Road but would have no impact on the immediate setting of those buildings set back behind trees on the western side of the road. Although the scale and design of the stadium and hotel would clearly differ from the retained surrounding buildings in this view, both would form a positive new landmark development adding a new dimension to the character and appearance of the conservation area.

8.6.94 At street level below, The Tottenham Experience building would reinforce the High Road building line in the form of a new two-storey terrace flanking the retained and fully restored Grade-II listed Warmington House. This new terrace, with glazed ground-floor shop fronts and cast-iron cladding to the upper levels, would match the scale and mass of the historic buildings flanking the High Road to the north and south and would also be in keeping with the scale of the locally listed Church of St Francis de Sale immediately opposite the site. The Tottenham Experience building would be a significant improvement on the arrangement of the buildings at 746-750 High Road which have lost their historic setting and have no coherent visual relationship with the High Road or each other. The proposed southern range of the Tottenham Experience building would be abutted by a fully-glazed entrance pavilion at the southern end that would also be prominent in this view. This would adjoin the southern steps to the podium, flanked on the opposite side by the landmark hotel building, providing a welcoming and obvious entrance to the Tottenham Experience building.

8.6.95 The proposed enhancements to the public realm along the High Road frontage, including the addition of street trees in front of the Tottenham Experience building, would substantially enhance the streetscape in this view.

8.6.96 Immediately east of the hotel the upper storeys of the western return elevation of the Extreme Sports Centre, articulated as a climbing wall, would be visible. This building would rise above the roofline of the public house on the east side of the High Road, and would be partially obscured by a large tree adjoining the pub. Its position, set back from the conservation area along Park Lane, and its subtle design would mean that it would have a neutral impact on the character of the conservation area overall, and in this view its height forms an appropriate step between the roofline of the stadium and that of the closest residential tower further east. The upper storeys of two of the four residential towers located further east along Park Lane would be visible in this view, the form of the upper floors, comprising a chamfered grid left open to the sky, allowing for visual permeability and reducing the mass and bulk of the towers.
Overall the proposals would enhance the character and appearance of the conservation area in this view and would enhance the immediate setting of the Grade-II listed Warmington House. The proposed development would have a negligible impact on the setting of the Grade-II listed Moselle House which is set back from the High Road within its own tree-lined area.

- Construction phase: Negligible
- Operational phase: Moderate Beneficial

The operational phase of the Project if assessed against the baseline of the consented scheme would also be moderate beneficial as the proposed scheme provides a much improved solution to this part of the High Road, seeing Warmington House reincorporated into a terrace.

View 34: West side of the High Road, just north of junction with Hampden lane

This view is taken from the southern end of the North Tottenham Conservation Area. On the western side of the High Road are the locally listed Nos. 641-663 (odd) High Road, a terrace of mid-late 19th century red brick buildings of four storeys with projecting single storey shop units on the ground floor. On the east side of the High Road, in the foreground is a Georgian terrace set back from the High Road behind large and small street trees. This terrace includes the Grade-II listed No. 662 (at the far right of the view), which was gutted by fire during the 2011 riots and is undergoing renovation. Adjacent to the north are Nos. 664 & 666 (Moore House) also Grade-II listed and of three storeys with a semi-basement, round-headed doorcases, fanlights and panelled entrance doors approached by entrance steps. Adjoining Moore House to the north, but concealed from view by the large trees on the High Road, are Nos. 668 & 668A, which are also Grade-II listed and retain their original Regency blind boxes on the first floor windows. Partially visible in the middle distance is the stock brick front elevation and clock tower of the Grade-II listed gate building for the former Whitbread Brewery at 676 High Road. Beyond this the development along the east side of the High Road is characterised by wider 20th century buildings interspersed with earlier 19th century development, all of a similar approximately three-storey height. Of these buildings Nos. 684, 684a & 684b and 686 to 690 are locally listed.

The Project would see the curved form of the stadium terminating the view north along the High Road behind the slender hotel tower, which would rise above the roofline of the stadium in the centre of the view, its lower levels concealed by the terraced High Road buildings. Although clearly of a much larger scale, the stadium and hotel would form a positive landmark development in this view. The angled upper storeys of the Extreme Sports Centre would also be visible immediately to the east of the hotel; this would rise up above the top of the clock tower to the Grade-II listed Whitbread gate building and would arguably have a minor adverse impact on the setting of the building in this view. Further to the east the four residential towers would be concealed from view, behind the trees on the east side of the High Road in the summer months. They would be partially visible behind and to the west of the Georgian terrace in this view in the winter months but the trees would still form an effective visual buffer and this limited impact in one view of the listed terrace would not be harmful to the overall significance of the listed buildings.

The Extreme Sports Centre would have a minor adverse impact on the wider setting of the Whitbread gate building. The overall impact on the conservation area in this view, however, would be minor beneficial as the stadium and hotel would act as a positive landmark at the centre of the view.

- Construction phase: Negligible
- Operational phase: Minor Beneficial
The operational phase of the Project if assessed against the baseline of the consented scheme would also be **minor beneficial** as the design of the proposed scheme is an improvement on that consented and provides an iconic landmark for Tottenham.

### Potential Environmental Impacts and Effects on the Heritage Assets in the Wider Area: Views Assessment

8.6.103 The visual impact of the Project on the setting of the identified heritage assets in the wider area has also been assessed using verified views produced by INK Associates that are included in the application at Appendix 12.5.

#### View 1: Alexandra Palace and Park Conservation Area

8.6.104 This view is located within the Alexandra Palace and Park Conservation Area. The viewpoint looks east and is taken from an area of high ground in the park. The ground, which is turfed in the forefront of the view slops down until it reaches a bank of trees in the middle distance. Beyond the bank of trees the urban development of North London spreads out to the horizon. A number of tall buildings are visible breaking the general building line and these add interest to the view.

8.6.105 The proposals would be visible close to the centre of the view. The Project would be a new landmark for Tottenham defining its position in North London. The tallest residential tower would rise up behind the proposed hotel building at the centre of the cluster of proposed buildings south of the stadium. The stepped form of the proposed towers, including the hotel, would break up the overall mass of development. The lower lying stadium would sit adjacent to the proposed hotel, with the diagonal line of its home stand end rising up towards the southern development.

- **Construction phase:** **Negligible**
- **Operational phase:** **Major Beneficial**

8.6.106 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would be **major beneficial** as the proposed scheme offers an overall improved design and landmark building in this view.

#### View 10: Tottenham Cemetery Conservation Area

8.6.107 This view is located within the Tottenham Cemetery Conservation Area and looks east. The cemetery is also designated as Metropolitan Open Land in Haringey's UDP and is a cemetery on the Council's Register of Public Parks, Gardens, Squares, Cemeteries and Churchyards of Local Historic Interest. The view is taken from in front of, and looking towards a Grade II listed War Memorial. The foreground of the view is characterised by a flagstone path leading to an area of gravestones and a bench which forms the memorial. The path is flanked by grass verges and manicured hedges that also enclose the area of gravestones. The middle ground of the view is entirely screened by a wall of large mature trees beyond which there are further trees, both within the area of the cemetery and along its eastern boundary.

8.6.108 This view shows that the proposed stadium and towers would not be visible in the summer months, being entirely concealed behind the wall of trees. In the winter months the Project may be partially visible but would still be partly screened by the trees. The proposals would therefore have a neutral impact on the
setting of the cemetery in this view.

- Construction phase: Negligible
- Operational phase: Negligible

8.6.109 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be negligible as neither would be visible.

**View 11: Bruce Castle Conservation Area, north-western edge of Bruce Castle Park**

8.6.110 This view is located within the Bruce Castle Conservation Area towards the north western edge of the park. Bruce Castle Park, in addition to Tottenham Cemetery, is also designated as Metropolitan Open Land in Haringey’s UDP and is a park on the Council’s Register of Public Parks, Gardens, Squares, Cemeteries and Churchyards of Local Historic Interest. The view looks northeast towards the largely two storey residential development to the edge of the park; further to the east is a school building with a clay-tile covered pitched roof. The foreground of the view is characterised by the flat lawns of the park.

8.6.111 The proposed stadium would rise behind the existing development stepping up to the residential towers to the south. There would be a marked increase in the scale of development visible from the park in this view and the impact on the wider setting of the Bruce Castle Conservation Area would be moderate adverse. However, during the summer months the stadium would most likely be entirely concealed by the trees in the park.

- Construction phase: Moderate Adverse
- Operational phase: Moderate Adverse

8.6.112 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would be minor adverse as the consented scheme would also be visible, its scale also a marked increase on the existing conditions.

**View 12: Bruce Castle Conservation Area, southern end of Bruce Castle Park**

8.6.113 This view is also located within the Bruce Castle Conservation Area. The viewpoint is located adjacent to and in front of the Grade-I listed Bruce Castle and looks north east. The topography of the park is very flat and views across it are largely screened by large mature trees. The park comprises large grassed areas traversed by footpaths, with areas of planting and a railing-enclosed children’s play area.

8.6.114 The proposals would not be visible in this view, being concealed behind successive banks of trees.

- Construction phase: Negligible
- Operational phase: Negligible

8.6.115 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would be negligible as neither scheme would be visible.
8.6.116 This view is taken from the Tottenham Green Conservation Area. On the west side of the High Road, partially visible in the immediate corner is the locally listed Nos. 389 & 391, the former Tottenham Library, built in 1896 and more recently converted to flats. Beyond this building, set back from the road, is the Grade-II listed No. 401 High Road, a three storey late 18th century pair of semi-detached houses that now form a single building. In the middle distance of the view is the locally listed No. 413 High Road, formerly the Felvers Hall. Built in 1925, the hall has pitched roofs and mullion and transom fenestration. In the foreground of the view on the east side of the High Road is a disused single-storey public toilet, constructed in brick in a mock-Tudor style with pitched roofs that have deep eaves and mock strapwork, its windows are currently boarded. Adjacent to this further north along the High Road the buildings are set back from the road behind a large area of public realm planted with bushes, beyond which the low scale development of the High Road continues.

8.6.117 The slender southern elevation of the hotel tower would just be visible in this view, but would be partly obscured by mature trees along the High Road. The curved form of the stadium would also be partly visible at the centre of the view. The proposed development would act as a major landmark for Tottenham, with the hotel tower providing an important marker for North Tottenham and the stadium development in this longer view. The residential towers would not be visible in this view.

- Construction phase: Negligible
- Operational phase: Minor Beneficial

8.6.118 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be minor beneficial, as the proposed stadium and hotel would provide a positive landmark development in this view.

8.6.119 This view is located in the Bruce Castle Conservation Area looking northeast over Edmansons Close. In the foreground of the view is Bruce Grove road. In the middle distance are railings, bushes and trees which screen an open area of lawn forming the setting to a group of terraced Grade-II listed almshouses. The Sailmaker’s Almshouses date from circa 1870 and flank three sides of the enclosed lawn with detached wings at either end. The buildings, which in this view are almost entirely concealed by the vegetation lining Bruce Grove, are two storeys and constructed from yellow stock brick with stone dressings and red brick eaves cornices with bands at first floor level. Visible at the centre of the view is the spire of the central gabled Gothic chapel. There are additional tall trees behind the terrace that extend up above its roofline in this view.

8.6.120 The majority of the proposed development would sit below the roofline of the Grade-II listed almshouses in this view. The upper sections of the two tallest residential towers extend above the general roofline but the tallest tower would be concealed behind the gabled roof form of the central chapel, while the second tower would be concealed by trees.

- Construction phase: Negligible
- Operational phase: Negligible

8.6.121 The operational phase of the Project if assessed against the baseline of the consented scheme would
also be **negligible** as neither scheme would be visible in this view.

**View 36: Scotland Green Conservation Area, west side of High Road opposite Aldi**

8.6.122 This view is located with the Scotland Green Conservation Area. On the west side of the High Road in this view the buildings are set back from the pavement line behind front areas enclosed with boundary walls and railings. These buildings include Charlton Cottage, a late 18\(^{th}\) century house of two storeys that is listed Grade II, and the Grade II* listed Nos. 583 and 585 High Road, a substantial early to mid-18\(^{th}\) century house which now forms two dwellings. The second floor sash windows of this building can just be seen through the trees. The front railings to 583-585 High Road, set in a low brick wall and linked by brick pillars, are also listed Grade II. On the east side of the High Road there is an almost continuous terrace of three storey buildings with shopfronts at ground floor level. No. 596 in the foreground is a locally listed building of three storeys with single brick semi-circular brick arches supported by simple brick pilasters to the second floor sash windows. Beyond the terraced buildings on the east side of the High Road, the view is terminated by trees either side of the road that conceal views of the buildings further north.

8.6.123 The four residential towers would be seen from this position on the High Road rising above the tree line, but the stadium and hotel would be largely concealed to the west by the curve in the road. The towers would be prominent in the view along the High Road and would have a minor adverse impact on the setting of the Scotland Green Conservation Area. This impact would be mitigated by the design of the towers, the upper storeys of which are chamfered and incorporate a grid left open to the sky, allowing for visual permeability and reducing their overall mass and bulk. The impact on the setting of the listed buildings on the eastern side of the High Road would be mitigated by the fact that these buildings are set back away from the High Road and the proposed development would have no impact on their immediate forecourt setting.

- Construction phase: **Negligible**
- Operational phase: **Minor Adverse**

8.6.124 The operational phase of the Project if assessed against the baseline of the consented scheme would also be minor adverse as the consented scheme would not be visible from this location.

**View 37: Bruce Grove Conservation Area, High Road, just north of junction with Bruce Grove**

8.6.125 This view is located within the Bruce Grove Conservation Area. On the west side of the High Road, forming a terrace are the locally listed Nos. 513 to 525 (odd) and 527 to 543 (odd) High Road, with modern shopfronts at ground floor level. Visible in the distance on the west side of the High Road are the tall brick chimneys of No. 549. This is a substantial three storey mid-19th century locally listed bank building. On the east side of the High Road are Nos. 522 to 528 (even), a three storey locally listed building, with a curved corner to its façade, that incorporates bands of deep blue glazed brick and large timber casement windows with glazing bars on the upper floors divided by cast iron fluted Corinthian pilasters. It is a building of architectural merit which has poorly integrated supermarket retail units at ground floor level that detract. Adjacent is a modern red brick building on a single plot between Factory Lane to the south and Dowsett Road to the north, and beyond this the corner bay of Windsor Parade, Nos. 538 to 554 (even) High Road with its octagonal stucco turret supported on fan-shaped corbel vaults above a canted round headed recessed entrance porch. The elaborately detailed three storey terrace is locally listed and was constructed in 1907. The group of lower modern buildings further north are just visible beyond which the view is terminated by a number of mature trees.
8.6.126 Only the form of the residential towers would be seen from this position on the High Road rising above the tree line at the terminus to the view along the High Road. The towers would have a moderate adverse impact on the wider setting of the Bruce Grove Conservation Area. This impact would be mitigated by the design of the towers, the upper storeys of which are chamfered and incorporate a grid left open to the sky, allowing for visual permeability and reducing their overall mass and bulk.

- Construction phase: Negligible
- Operational phase: Minor Adverse

8.6.127 The operational phase of the proposed scheme if assessed against the baseline of the consented scheme would also be minor adverse as the consented scheme would not be visible from this location.

8.7 Assessment Summary and Residual Environmental Impacts and Effects

Demolition and Construction

8.7.1 With the implementation of the mitigation measures as set out above, the potential impacts of the demolition and construction phase should be minimised as far as practically possible. As such, the residual impact during the demolition and construction phase on the retained significant fabric is envisaged to be, at worst, minor adverse.

Completed Development

8.7.2 The proposed development would see the transformation of this area of north London with investments leading to substantial and essential regeneration. The new twelve-months-a-year international-quality sports stadium designed by Populous Architects would substantially raise the profile of Tottenham, more so than the consented stadium due to its additional uses, bringing more visitors to the area and increasing its economic vitality, particularly the immediate environs of Tottenham High Road. The proposed residential development would provide much-needed additional housing in Tottenham, the hotel and other commercial uses within the stadium development would provide additional jobs contributing towards the wider regeneration of the area, while the Extreme Sports Centre and proposed health centre would benefit the health of the local community, a key priority for the London Borough of Haringey. These major positive impacts must be taken into account when assessing the overall impact of the proposals on heritage assets.

8.7.3 It is essential to take into account that a stadium of similar proportions and scale was consented in 2011 with the ground works for its construction already underway. The principle of the construction of a stadium immediately abutting the High Road and adjoining nearby listed buildings within the boundary and setting of the North Tottenham Conservation Area has therefore been established. The consented scheme also allows the construction of four large residential blocks between the stadium and Park Lane. The principle of large-scale development, albeit of a maximum height of approximately fifty-seven metres, within the area of the proposed residential towers; Extreme Sports Centre and hotel, that would contrast with the smaller scale of nearby historic buildings, has therefore also been established.

8.7.4 The following table summarises the potential impacts of the Project and the resulting residual impact against the existing baseline conditions. This assessment takes into account the impacts on the designated and non-designated heritage assets which form part of the Project Site, the impact on views across the North Tottenham Conservation Area and the impact on the wider setting of six conservation areas.
areas within the wider area.

Table 8.2 Cultural Heritage Assessment Summary

<table>
<thead>
<tr>
<th>Heritage Asset</th>
<th>Description of Potential Impact/Description of View Location</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warmington House, Grade-II listed building</td>
<td>Restoration and re-use of Warmington House as part of the proposed Tottenham Experience Museum</td>
<td>Major Beneficial</td>
</tr>
<tr>
<td>Northern Terrace, Grade-II and Grade-II* listed buildings</td>
<td>Construction of the proposed development within the wider setting of the listed terrace</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>North Tottenham Conservation Area</td>
<td>Demolition and replacement of three locally listed buildings in the conservation area with new buildings forming the proposed Tottenham Experience</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td></td>
<td>Restoration and re-use of Warmington House and construction of the proposed Tottenham Experience building in the conservation area</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td></td>
<td>Construction of new stadium in, and within the setting of, the conservation area</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td></td>
<td>Construction of hotel within the setting of the conservation area</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td></td>
<td>Construction of four residential towers within the setting of the conservation area</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Construction of Extreme Sports Centre within the setting of the conservation area</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

North Tottenham Conservation Area, Views Assessment:

<table>
<thead>
<tr>
<th>View</th>
<th>Impact of proposed development on views within the conservation area (view locations described below):</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>View 15</td>
<td>West side of the High Road at the junction with Lordship Lane</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 16</td>
<td>West side of the High Road opposite the junction with Northumberland Park</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 23</td>
<td>West side of the High Road, at junction with Cedar Road</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 26</td>
<td>White Hart Lane</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 27</td>
<td>West side of the High Road, at the junction with White Hart Lane</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 31</td>
<td>South side of Church Road, looking northeast</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 32</td>
<td>West side of the High Road, at the junction with Ruskin Road</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View</td>
<td>Description</td>
<td>Impact</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>View 33</td>
<td>West side of the High Road opposite, and just north of junction with Bromley Road</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td>View 34</td>
<td>West side of the High Road, just north of junction with Hampden lane</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>Alexandra Palace and Park Conservation Area: View 1</td>
<td>Impact of proposed development on wider setting of conservation area.</td>
<td>Major Beneficial</td>
</tr>
<tr>
<td>Tottenham Cemetery Conservation Area: View 10</td>
<td>Impact of proposed development on wider setting of conservation area.</td>
<td>Negligible</td>
</tr>
<tr>
<td><strong>Bruce Castle Conservation Area:</strong></td>
<td>Impact of proposed development on wider setting of conservation area (view locations described below):</td>
<td></td>
</tr>
<tr>
<td>View 11</td>
<td>Bruce Castle Conservation Area, north-western edge of Bruce Castle Park</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td>View 12</td>
<td>Bruce Castle Conservation Area, southern end of Bruce Castle Park</td>
<td>Negligible</td>
</tr>
<tr>
<td>View 35</td>
<td>Bruce Castle Conservation Area, Bruce Grove adjoining Edmansons Close</td>
<td>Negligible</td>
</tr>
<tr>
<td>Tottenham Green Conservation Area: View 13</td>
<td>Impact of proposed development on wider setting of conservation area</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>Scotland Green Conservation Area: View 36</td>
<td>Impact of proposed development on wider setting of conservation area</td>
<td>Minor Adverse</td>
</tr>
<tr>
<td>Bruce Grove Conservation Area: View 37</td>
<td>Impact of proposed development on wider setting of conservation area</td>
<td>Minor Adverse</td>
</tr>
</tbody>
</table>
9. Ecology

9.1 Introduction

9.1.1 This chapter of the ES has been produced by CSa Environmental Planning and assesses the likely significant effects of the Project in terms of Ecology.

9.2 Assessment Criteria and Methodology

Previous Assessment

Ecological Assessment & Nesting Bird Survey

9.2.1 The full methodology and results of surveys undertaken as part of the 2008 ecological assessment are provided in the Ecological Assessment report in Appendix 9.1.

9.2.2 The full methodology and results of a nesting bird survey undertaken in April and May 2014 are provided in the Nesting Bird Survey Report in Appendix 9.2.

9.2.3 Table 9.1 below summarises these surveys and their findings:

Table 9.1: Summary of Previous Survey Work

<table>
<thead>
<tr>
<th>Survey</th>
<th>Summary of survey findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended Phase 1 Habitat Survey (15 May 2008)</td>
<td>- The vast majority of the site comprises buildings and hardstanding, with very limited areas of habitat present, none of which have significant ecological value.</td>
</tr>
<tr>
<td></td>
<td>- A small quantity of Japanese knotweed Fallopia japonica was recorded in the north-west of the site.</td>
</tr>
<tr>
<td></td>
<td>- Brief assessment of the buildings on site identified several buildings that could potentially support roosting bats.</td>
</tr>
<tr>
<td>Bat Transect Surveys (dusk and dawn 26-27 June 2008 and 08-09 July 2008)</td>
<td>- Low levels of bat activity at the site, limited to a small number of passes by noctule Nyctalus noctula bats.</td>
</tr>
<tr>
<td></td>
<td>- Additional noctule passes and very low levels of common pipistrelle foraging detected from land adjacent to the site boundary.</td>
</tr>
<tr>
<td></td>
<td>- No behavioural evidence to suggest that bats roost at the site or use it for any significant foraging.</td>
</tr>
<tr>
<td>Nesting Bird Survey (Four breeding bird between 23 April and 29 May 2014)</td>
<td>- A pair of kestrels Falco tinnunculus (amber-listed Bird of Conservation Concern (BoCC); London Species of Conservation Concern) were recorded nesting in the lower rear half of the north stand monitor screen.</td>
</tr>
<tr>
<td></td>
<td>- A pair of starlings Sturnus vulgaris (red-listed BoCC; UK &amp; London BAP Priority Species; London Species of Conservation Concern) were recorded nesting above a doorway into the stadium, beneath a concrete ledge.</td>
</tr>
<tr>
<td></td>
<td>- Swifts Apus apus (amber-listed BoCC; London Species of Conservation Concern) were recorded flying over the site.</td>
</tr>
</tbody>
</table>

Legislative Context

9.2.4 In relation to wildlife and nature conservation, two key Directives have been adopted by the European Union, namely:

- Directive 2009/147/EC on the Conservation of Wild Birds (Birds Directive); and

9.2.5 These Directives provide for the protection of animal and plant species of European importance and the habitats which support them, particularly through the establishment of a network of protected sites, called Natura 2000.

Bats

9.2.6 All species of British bats are legally protected under part 3 (section 41) of the Conservation of Habitats and Species Regulations 2010. These Regulations make it an offence to:

• Deliberately capture, injure, kill or capture a bat;
• Deliberately disturb bats, impairing their ability to survive, breed, reproduce or rear/nurture their young;
• Damage or destroy a breeding site or resting place used by bats; or
• Be in possession of, transport, sell, exchange or offer to sell/exchange a bat (dead or alive) or any part of a bat.

9.2.7 All bats and their roosts in England, Scotland and Wales were originally protected under the Wildlife & Countryside Act 1981. Subsequent amendments to the legislation for England and Wales has removed bats from most of the provisions of the Act, however it remains an offence to:

• Intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection; or
• Intentionally or recklessly obstruct access to any structure or place that a bat uses for shelter or protection.

9.2.8 Disturbance of bats is covered by both the 2010 Regulations and the 1981 Act, with the magnitude of disturbance critical. Disturbance that impairs survival or successful reproduction would be covered by the Regulations with no legal defence existing. Less significant acts of disturbance may only be covered by the Wildlife & Countryside Act 1981, which includes some legal defences that may be applied in certain circumstances.

9.2.9 It is important to note that bat roosts are protected throughout the year, regardless of whether or not bats are present at the time. Under the Conservation of Habitats and Species Regulations the offence of damaging or destroying a breeding site or resting place of bats is not subject to any legal defence, i.e. an offence will have been committed even if the damage or destruction occurs accidentally.

Licensing

9.2.10 Where development is proposed that would result in an offence under the Habitats and Species Regulations a European Protected Species (EPS) licence needs to be granted by the appropriate authority (Natural England in England) to permit an act that would otherwise be unlawful. This provides for a specific derogation from the legislation, to prevent a legal infringement occurring. To obtain an EPS licence for development it must be demonstrated that the purpose of the act to be licensed is for:

"preserving public health or public safety or other imperative reasons of overriding public interest including those of social or economic nature and beneficial consequences of primary importance for the
environment" (Regulation 53(2)(I))."

9.2.11 In addition Natural England will not grant an EPS licence unless they are satisfied that:

- "There is no satisfactory alternative" (Regulation 53(9)(a)); and
- The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range" (Regulation 53(9)(b))."

Planning Policy and Guidance

National Planning Policy

9.2.12 There are several pieces of national legislation relating to wildlife and biodiversity. Those that are of particular relevance to ecology and development are the Conservation of Habitats and Species Regulations 2010 (as amended), which enacts the Habitats and Birds Directives into UK law, the Wildlife and Countryside Act 1981 (as amended) and, regarding specific protection of badgers, the Protection of Badgers Act 1992. Legislation relating to specific protected sites, habitats and species is set out under the relevant subheadings under Baseline Conditions below.

9.2.13 The Natural Environment and Rural Communities (NERC) Act 2006 requires planning authorities to consider impacts on “species of principal importance for the conservation of biodiversity” when determining planning applications, as described under Biodiversity and Priority Species below. These pieces of legislation and the species and habitats to which they afford protection have been addressed in this Chapter.

9.2.14 Natural England Standing Advice regarding protected species aims to support local authorities and forms a material consideration in determining applications.

9.2.15 The National Planning Policy Framework (DCLG, 2012) (NPPF) sets out planning policies for England and how they should be applied. With regards to ecology and biodiversity, Chapter 11: Conserving and Enhancing the Natural Environment, paragraph 109, states that the planning system and planning policies should:

- Minimise impacts on, and provide net gains in, biodiversity where possible, “contributing to the Government’s commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures”; and
- Recognise the wider benefits of ecosystem services.

9.2.16 Under these aims, paragraph 117 states the need to plan for biodiversity at a landscape scale, linked to national and local targets. Paragraph 118 sets out the principles that local planning authorities should apply when determining planning applications:

- Refuse planning permission if significant harm cannot be avoided, adequately mitigated, or, as a last resort, compensated for;
- Encourage opportunities to incorporate biodiversity in and around developments;
- Permission should not normally be permitted where an adverse effect on a nationally designated Site of Special Scientific Interest (SSSI) is likely, either individually or in combination with other developments; and
Refuse planning permission if development will result in the loss or deterioration of irreplaceable habitats, such as ancient woodland and the aged or veteran trees, unless the need for, and benefits of, the development in that location clearly outweigh the loss.

9.2.17 The core theme of the NPPF is a “presumption in favour of sustainable development” (Paragraph 14). This does not, however, apply where Appropriate Assessment under the Birds or Habitats Directives is being considered, planned or determined (paragraph 119). Appropriate Assessment is required where a plan or project may affect a European Special Protection Area (designated SPA and proposed pSPA) or Special Area of Conservation (designated SAC and candidate cSAC), either alone or in combination with other plans or projects. Together SPA and SAC sites form the network of protected sites known as Natura 2000. Designated and proposed Ramsar sites are also attributed the same protection as Natura 2000 sites under the NPPF.

9.2.18 Government Circular 06/2005 Biodiversity and Geological Conservation, which is referred to in the NPPF, provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system.

9.2.19 On 6 March 2014 the Department for Communities and Local Government (DCLG) launched the National Planning Practice Guidance as a web-based resource. Guidance categories that are considered relevant to ecology include Light pollution (ID:31; paragraph 007), which considers the potential impacts of light pollution on ecology, and Natural Environment (ID: 8; paragraph 007), which provides guidance in terms of biodiversity, ecosystems and green infrastructure.

Regional Planning Policy


9.2.20 The London Plan forms the overall strategic plan for the capital. It provides a framework for economic, environmental, transport and social development to 2031. The Local Plans of each London Borough should be written in general conformity with the London Plan.

POLICY 2.18: GREEN INFRASTRUCTURE: THE MULTI FUNCTIONAL NETWORK OF GREEN SPACES

9.2.21 Policy 2.18 of the London Plan relates to green infrastructure and states that development proposals should incorporate appropriate elements of green infrastructure that are integrated into the wider network.

POLICY 7.19: BIODIVERSITY AND ACCESS TO NATURE

9.2.22 Policy 7.19 of the London Plan considers biodiversity. Where possible, development should make a positive contribution to the protection, enhancement, creation and management of biodiversity (green roofs and living walls are suggested measures to enhance biodiversity).

POLICY 7.21: TREES AND WOODLANDS

9.2.23 Existing trees of value should be retained. Where appropriate, the planting of additional trees should be included in new developments.
Local Planning Policy

Haringey Local Plan: Strategic Policies (adopted March 2013)

9.2.24 The Local Plan: Strategic Policies sets out a vision and key policies for the future development of the borough of Haringey up to 2026. Policies considered relevant to the proposed development in terms of ecology include:

9.2.25 Policy SP11: Design - All new development should enhance and enrich Haringey’s built environment and create places and buildings that are high quality, attractive, sustainable, safe and easy to use. To achieve this all development shall... Promote high quality landscaping on and off site, including improvements to existing streets and public spaces...

9.2.26 Policy SP13: Open Space and Biodiversity – All development shall protect and improve sites of biodiversity and nature conservation, including private gardens through its... Contribution to wildlife and ecological habitats and, where possible, include green and brown roofs, rainwater harvesting, green walls, bird and bat nesting/roosting opportunities... Protection, management and maintenance of existing trees and the planting of new trees where appropriate...

Haringey Unitary Development Plan Saved Policies (adopted July 2006; saved March 2013)

9.2.27 UD3: General Principles – The council will require development proposals to demonstrate that... e) opportunities for soft landscaping, including appropriate tree retention and tree planting, have been taken into account.

9.2.28 ENV7: Air, Water and Light Pollution – The Council will control potential pollution resulting from development in the borough by... b) requiring developments to include measures to avoid, reduce and only then mitigate the emissions of pollutants, where appropriate; c) separating potentially polluting activities from sensitive areas (green belt, MOL or ecologically valuable sites) or uses (schools, hospitals, homes)...

9.2.29 OS17: Tree Protection, Tree Masses and Spines – The Council will seek to protect and improve the contribution of trees, tree masses, and spines to local landscape character by... b) encouraging tree planting wherever possible and appropriate... c) ensuring that road proposals and traffic management schemes are adequately landscaped where appropriate with new trees... d) ensuring that, when unprotected trees are affected by development, a programme of tree replanting and replacement of at least equal amenity and ecological value and extent is approved by the Council...

Biodiversity Action Plans & Biodiversity 2020 Strategy

9.2.30 The Natural Environment and Rural Communities Act 2006 Section 40(1) states that each public authority “must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity”.

9.2.31 This legislation makes it clear that Local Planning Authorities should consider impacts to biodiversity when determining planning applications, with particular regard to the Section 41 list of 56 habitats and 943 species of principal importance, even where they are not covered by other legislation. The S41 list was taken forward for action under the UK BAP (first published in 1994). The UK BAP has now been superseded by the Biodiversity 2020 Strategy (published August 2011), which continues to prioritise the
S41 list, setting national targets for the period to 2020, and the UK Post-2010 Biodiversity Framework (published July 2012), which shows how these contribute to targets at the European level.

9.2.32 At a regional level the Site is covered by the London BAP and at a local level by the BAP for the Borough of Haringey. Species Action Plans (SAPs) and Priority species listed within the UK and London BAP that could be potentially relevant to this site include Bats (UK, London and Haringey BAPs), House Sparrow (UK and London BAP, Species of Local Conservation Concern), Swift (Local Species of Conservation Concern) and Kestrel (Local Species of Conservation Concern). Bats (all species) are also included as a SAP within the Haringey BAP. A Built Structures Habitat Action Plan (HAP) and Gardens HAP also form part of the Haringey BAP and this is also considered relevant.

**Guidance/ Best Practice**

9.2.33 The methodology for this assessment is based on the 2006 Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom, published by the (Chartered) Institute of Ecology and Environmental Management. These guidelines provide a robust framework for ecological assessment, which is then further informed by professional judgement and interpretation.

**Baseline Data Collection**

**Desk Study**

9.2.34 The Multi-Agency Geographic Information for the Countryside (MAGIC) online database was searched to identify all relevant statutory nature conservation sites. The following two searches were undertaken, taking into account the level of designation and the distance over which effects could potentially occur:

- A 3km-radius search around the Site to search for nationally and locally important sites (i.e. Local Nature Reserves (LNRs), National Nature Reserves (NNRs), Sites of Special Scientific Interest (SSSIs)); and
- A 10km-radius search around the site to search for internationally important sites (i.e. Ramsar sites, Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)).

9.2.35 A biological records search was also conducted for the area of land encompassing the site and adjacent land within a 1km-radius area of the site’s central grid reference. Greenspace information for Greater London (GiGL) was contacted for records of non-statutorily designated wildlife sites, protected and notable habitats and species.

9.2.36 Waterbodies within a 0.5km radius of the Site boundary were also identified using online Ordnance Survey mapping (Promap) such that these may be considered in line with Natural England Great Crested Newt Mitigation Guidelines (English Nature, 2001).

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21 Available online at www.magic.gov.uk
22 Available online at www.promap.co.uk
Field Survey

Extended Phase 1 Habitat Survey

9.2.37 An extended Phase 1 Habitat survey was carried out on 29 May 2015 during fine and dry weather conditions by Dr Martin Brammah MCIEEM, encompassing the site and immediately adjacent habitats that could be viewed. This survey technique is at a level intermediate between the Phase 1 survey (JNCC, 2010)24 (where standardised habitat mapping is undertaken, together with making notes on dominant and notable species) and the more detailed survey techniques that may be used to specifically record or survey particular habitats or species. In this survey, plant species observed within each habitat type are recorded and habitats are classified and mapped. Scientific names of botanical species are referenced in accordance with Stace (2010)25. Note is also taken of the more conspicuous fauna present during the survey, with particular attention paid to any evidence of, or potential for, the presence of protected or notable species.

Protected/Notable Species Surveys

9.2.38 A range of surveys has also been undertaken to assess the potential for significant negative effects on bats as a result of development at the Site. A summary of these surveys is presented in Table 9.2 below.

Table 9.2 – Summary of Protected / Notable Species Surveys Undertaken in 2015

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Surveys Undertaken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bats</td>
<td>- Building assessment and inspection survey for bat roost potential (29 May 2015)</td>
</tr>
<tr>
<td></td>
<td>- Transect surveys (9, 22 June and 8 July 2015)</td>
</tr>
<tr>
<td></td>
<td>- Static detector surveys (10-22 June 2015; 9-20 July; 3-10 August)</td>
</tr>
</tbody>
</table>

Bats: Building Inspection

9.2.39 A detailed external and, where possible, internal inspection of all accessible buildings on the site was carried out on 29 May 2015 during fine and dry weather conditions by Dr Martin Brammah MCIEEM, holder of a Natural England bat licence (Class Survey Licence WML-CL18; Registration Number 2015-14077-CLS-CLS).

9.2.40 Buildings were inspected using binoculars and a high-powered torch, as necessary, to search for direct evidence of roosting bats (i.e. live/dead bats, droppings, insect feeding remains, grease/urine stains associated with roosting features) or features offering potential roosting opportunities to bats (e.g. holes/crevices associated with roof eaves/tiles, gaps in brickwork/mortar etc.).

9.2.41 Based on the amount of bat roosting evidence recorded, buildings were rated in terms of their bat roost potential from ‘negligible’ (i.e. buildings of no value to roosting bats) to ‘high’ (i.e. buildings with significant associated bat roosting evidence).

Bats: Static Detector Surveys

9.2.42 In order to better understand general levels of bat activity on site over an extended period of time, three Wildlife Acoustics SM2 bat detectors were positioned in three locations on site (A, B and C on the Bat

Survey Plan in Appendix 9.5) and left to record automatically for three periods of several nights. The SM2s were collected at the end of each recording period and calls from the three nights with the most suitable weather were analysed. Table 9.3 below provided details of the weather conditions during each of the three recording periods.

9.2.43 Data recorded on each SM2 during the three recording periods was downloaded and analysed using AnalookW v.4.11 to identify the species present and the total number of bat passes within each recording period, for each species, at each location, calculated from the number of recorded files containing a bat call. Although not synonymous with actual numbers of bats, this ‘bat pass’ information provides an indication of the relative abundance of bat species across a site. The total number of bat passes was then used to calculate the mean number of bat passes per hour for each species.
9.2.44 Bat surveys: Three dusk bat activity transect surveys were carried out at the Site on 9 June, 22 June and 8 July 2015. All three surveys were undertaken by experienced bat surveyors Dr Martin Brammah MCIEEM, Michelle Bullock GradCIEEM and Alexandra Cole GradCIEEM, with due consideration of the Bat Conservation Trust Good Practice Guidelines.

9.2.45 Three dusk bat activity transect surveys were carried out at the Site on 9 June, 22 June and 8 July 2015. All three surveys were undertaken by experienced bat surveyors Dr Martin Brammah MCIEEM, Michelle Bullock GradCIEEM and Alexandra Cole GradCIEEM, with due consideration of the Bat Conservation Trust Good Practice Guidelines.

9.2.46 Three transect routes were designed to cover features with potential bat interest, such as possible flight lines and foraging areas. The transect routes were walked by three surveyors, with surveyors pausing for five-minute periods at ten pre-selected points along the route to record bat activity and provide a representative sample of the habitat-types present on site. When bats were encountered, notes were made of the species, abundance and any other relevant information.

9.2.47 Table 9.3 – Static Bat Detector Survey Weather Conditions

<table>
<thead>
<tr>
<th>Date (2015)</th>
<th>Time</th>
<th>Temp (°C)</th>
<th>Rain (mm)</th>
<th>Cloud (%)</th>
<th>Wind speed (mph)</th>
<th>Comments on weather conditions in relation to bat activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/10 July</td>
<td>21:00</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>00:00</td>
<td>8</td>
<td>0</td>
<td>12</td>
<td>13</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>03:00</td>
<td>9</td>
<td>0</td>
<td>17</td>
<td>15</td>
<td>Suitable</td>
</tr>
<tr>
<td>10/11 July</td>
<td>21:00</td>
<td>15</td>
<td>0</td>
<td>14</td>
<td>15</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>00:00</td>
<td>12</td>
<td>0</td>
<td>22</td>
<td>13</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>03:00</td>
<td>12</td>
<td>0</td>
<td>23</td>
<td>12</td>
<td>Suitable</td>
</tr>
<tr>
<td>11/12 July</td>
<td>21:00</td>
<td>18</td>
<td>1.4</td>
<td>33</td>
<td>9</td>
<td>Suitable, with suboptimal period of rain</td>
</tr>
<tr>
<td></td>
<td>00:00</td>
<td>15</td>
<td>2.1</td>
<td>100</td>
<td>5</td>
<td>Suitable, with suboptimal period of rain</td>
</tr>
<tr>
<td></td>
<td>03:00</td>
<td>14</td>
<td>0.3</td>
<td>100</td>
<td>18</td>
<td>Suitable, with suboptimal period of rain</td>
</tr>
<tr>
<td>09/10 July</td>
<td>21:00</td>
<td>18</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>00:00</td>
<td>14</td>
<td>0</td>
<td>43</td>
<td>7</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>03:00</td>
<td>13</td>
<td>0</td>
<td>12</td>
<td>7</td>
<td>Suitable</td>
</tr>
<tr>
<td>10/11 July</td>
<td>21:00</td>
<td>18</td>
<td>0</td>
<td>74</td>
<td>8</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>00:00</td>
<td>17</td>
<td>0</td>
<td>32</td>
<td>8</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>03:00</td>
<td>15</td>
<td>0</td>
<td>8</td>
<td>5</td>
<td>Suitable</td>
</tr>
<tr>
<td>11/12 July</td>
<td>21:00</td>
<td>17</td>
<td>0</td>
<td>42</td>
<td>9</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>00:00</td>
<td>14</td>
<td>0</td>
<td>59</td>
<td>8</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>03:00</td>
<td>14</td>
<td>0.1</td>
<td>100</td>
<td>11</td>
<td>Suitable, with suboptimal period of rain</td>
</tr>
<tr>
<td>07/08 August</td>
<td>21:00</td>
<td>19</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>00:00</td>
<td>16</td>
<td>0</td>
<td>6</td>
<td>6</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>03:00</td>
<td>14</td>
<td>0</td>
<td>11</td>
<td>5</td>
<td>Suitable</td>
</tr>
<tr>
<td>08/09 August</td>
<td>21:00</td>
<td>19</td>
<td>0</td>
<td>14</td>
<td>8</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>00:00</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>03:00</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>Suitable</td>
</tr>
<tr>
<td>09/10 August</td>
<td>21:00</td>
<td>22</td>
<td>0</td>
<td>37</td>
<td>6</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>00:00</td>
<td>16</td>
<td>0</td>
<td>33</td>
<td>7</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>03:00</td>
<td>15</td>
<td>0</td>
<td>66</td>
<td>7</td>
<td>Suitable</td>
</tr>
</tbody>
</table>

recorded on the likely species and, when bats could be seen, their behaviour, such as direction of flight, numbers of bats and type of activity e.g. foraging/commuting. Any bat activity observed between transect points was also recorded and described.

9.2.47 The transect surveys commenced 15 minutes before sunset and continuing for two hours after sunset. During each survey, bat activity was recorded using broadband Batbox Duet and Wildlife Acoustics EM3 bat detectors, recording all bat calls for later analysis. All transect surveys were undertaken during suitable weather conditions. These are summarised with dates in Table 9.4 below.

<table>
<thead>
<tr>
<th>Survey Date (2015)</th>
<th>Sunset Time</th>
<th>Survey Duration (mins)</th>
<th>Temp (ºC)</th>
<th>Rain</th>
<th>Cloud oktas (n/8)</th>
<th>Wind (Beaufort scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09 June</td>
<td>21:16</td>
<td>135</td>
<td>19</td>
<td>No rain</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>22 June</td>
<td>21:22</td>
<td>135</td>
<td>17</td>
<td>No rain</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>08 July</td>
<td>21:18</td>
<td>135</td>
<td>13</td>
<td>No rain</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

9.2.48 As well as making a qualitative assessment of bat activity at the site based on surveyor observations, a quantitative analysis of the data recorded during the transect surveys was also undertaken. This allowed for a more thorough assessment of the value of the site for bats to be made, in combination with observational data on factors such as direction of flight, numbers of bats or type of activity i.e. foraging / commuting observed during the survey.

9.2.49 Data recorded during the surveys was downloaded and analysed using AnalookW v.4.1t to identify the species present and quantify the number of bat passes. As each transect point was consistently sampled for multiple five minute periods the relative number of passes/minute in total, and for each species, could be calculated for different parts of the site. Bat passes recorded during the time spent walking between transect points were not included within the calculation of bat passes/minute but are included within the discussion and overall evaluation of bat activity at the site.

**Assessment Methodology**

9.2.50 The methodology for this assessment is based on the 2006 Guidelines for Ecological Impact Assessment (EIA) in the United Kingdom, published by the (Chartered) Institute of Ecology and Environmental Management. These guidelines provide a robust framework for ecological assessment, which is then further informed by professional judgement and interpretation.

7.1.1. The main aims of this assessment are to:

- Consider the activities and biophysical changes likely to be associated with the proposed development and its zone of influence;
- Identify the baseline conditions within the zone of influence, with particular reference to those valued ecological receptors/features that are likely to be affected;
- Describe and assess the potential effects on the structure and function of the systems on which these features depend, in the absence of mitigation;
- Describe any mitigation needed to avoid or minimise adverse effects and explain how such actions have been incorporated into the scheme;
- Describe any compensation needed where an effect cannot be reduced to an insignificant level; and
Set out the net anticipated effects of the proposed development, complete with mitigation.

**Significance Criteria**

*Identification of Valued Ecological Receptors*

9.2.51 The geographic frame of reference used for assigning value to ecological receptors/features is based on that recommended in the IEEM guidelines, where ecological resources are assessed as having value at the following levels:

- International
- UK
- National
- Regional
- County
- District (or Borough)
- Local (or Parish)
- Site

9.2.52 Valuing ecological features can be complex. Other considerations include their potential value, social value to the local community, any important function they serve within a wider ecosystem and the level of legal protection they receive. Ecological features considered to be of value at the Local level or above are classed as Valued Ecological Receptors (VERs).

**Determination of Significance**

9.2.53 The significance of an ecological effect, whether adverse or beneficial, has been assessed in accordance with the IEEM guidelines. An effect is considered to be significant if it is likely to result in a change in the conservation status or degree of integrity of any VER.

**Geographical Scope**

9.2.54 For the purpose of this assessment the zone of influence is different in relation to the various ecological resources under consideration.

9.2.55 Three zones of influence are recognised as follows:

- **Internationally important designations**: The area occupied by a 10km radius around the site boundary, to take into account variation in individual zones of influence relating to such sites.
- **Nationally important designations**: The area occupied by a 3km radius around the site boundary, to take into account variation in individual zones of influence relating to such sites.
- **Locally important designations**: The area occupied by a 1km-radius around the site’s central grid reference (i.e. the GiGL search area for biological records and non-statutory designations).
- **Non-statutory designation**: Identical zone of influence to previous.
- **Protected and notable species**: Identical zone of influence to previous, except where the species in question is a qualifying feature of a nationally or internationally important designation, in which case the relevant zone of influence for these designations applies.
Cumulative Development

9.2.56 All committed development sites identified on the Cumulative Development Schedule have been taken into consideration in order to assess the potential for in-combination effects on VERs. Fully operational sites have not been included in this assessment as it is considered that these sites are already having an established effect.

Assumptions and Limitations

9.2.57 No assumptions have been made and there have been no limitations to our survey work.

9.3 Baseline Conditions

9.3.1 The results of the GiGL data search are provided in Appendix 9.3. This includes a summary of the results and plans highlighting statutorily and non-statutorily designated wildlife sites identified within the data search area.

Designated Wildlife Sites

9.3.2 No statutory wildlife site designations cover any part of the Project Site. Two internationally important designations are present within 10km of the Project Site: Lee Valley Ramsar and Special Protection Area (SPA); and Epping Forest Special Area of Conservation (SAC). Two nationally important designations are present within 3km of the Project Site: Walthamstow Reservoirs Site of Special Scientific Interest (SSSI); and Chingford Reservoirs SSSI. No locally important sites occur within 3km of the site boundary.

9.3.3 Descriptions of the statutory sites are provided in Table 9.5 below.

Table 9.5 – Statutory Sites

<table>
<thead>
<tr>
<th>Site Name &amp; Designation</th>
<th>Distance &amp; Direction from Survey Area</th>
<th>Brief Description of Designated Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internationally Important Sites Within 10km</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lee Valley SPA and Ramsar site</td>
<td>c. 1.2 km south-east</td>
<td>Supports internationally important numbers of migratory gadwall Anas strepera and shoveler Anas clypeata duck and nationally important numbers of bitterns Botaurs stellaris which winter in the Valley. Many other waterbirds reach levels of national significance. The wintering numbers of many other birds are of regional or local importance. Overall the wetlands of the Lee Valley Regional Park represent one of the major inland wintering areas for birds in the UK, supporting over 10,000 birds every winter.</td>
</tr>
</tbody>
</table>
### Site Name & Designation

<table>
<thead>
<tr>
<th>Site Name &amp; Designation</th>
<th>Distance &amp; Direction from Survey Area</th>
<th>Brief Description of Designated Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epping Forest SAC</td>
<td>c. 4.6 km</td>
<td>Epping Forest is a large woodland area in which records of stag beetle <em>Lucanus cervus</em> are widespread and frequent; the site straddles the Essex and east London population centres. Epping Forest is a very important site for fauna associated with decaying timber, and supports many Red Data Book and Nationally Scarce invertebrate species. Epping Forest represents Atlantic acidophilous beech forests in the north-eastern part of the habitat’s UK range. Although the epiphytes at this site have declined, largely as a result of air pollution, it remains important for a range of rare species, including the moss <em>Zygodon forsteri</em>. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and dead-wood invertebrates.</td>
</tr>
</tbody>
</table>

### Nationally Important Sites Within 3km

<table>
<thead>
<tr>
<th>Site Name &amp; Designation</th>
<th>Distance &amp; Direction from Survey Area</th>
<th>Brief Description of Designated Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walthamstow Reservoirs SSSI</td>
<td>c. 1.2 km south-east</td>
<td>The Walthamstow Reservoirs contain one of the country’s major heronries and a particularly large concentration of breeding wildfowl. They are also an important gathering area for moult refuges of diving birds.</td>
</tr>
<tr>
<td>Chingford Reservoirs SSSI</td>
<td>c. 2.6 km north-east</td>
<td>The Chingford Reservoirs are one of the major wintering grounds for wildfowl and wetland birds in the London area and hold nationally important numbers of some species. The reservoirs also form a moult refuge for large populations of wildfowl during the late summer months. During the winter months the reservoirs regularly support nationally important populations of shoveler and greater crested grebe <em>Podiceps cristatus</em>. Other wildfowl which winter on the reservoirs in important numbers include goldeneye <em>Bucephala clangula</em>, tufted duck and goosander <em>Mergus merganser</em>, with populations of the latter two species occasionally reaching levels of national significance.</td>
</tr>
</tbody>
</table>

### Non-statutory Sites

9.3.4 The desk-based information search provided by GiGL highlights the presence of two non-statutory Sites of Importance for Nature Conservation (SINCs) located within the data search area. These sites are identified by the Greater London Authority on account of their flora and fauna and are graded on the basis of their importance to a particular defined geographic area in the following order of importance:

- Metropolitan > Borough Grade I > Borough Grade II > Local

9.3.5 Both SINCs are Sites of Borough Importance (SBI) Grade II and are located within 1km of the Project Site. Given their proximity to the Project Site, they are considered to be within the potential zone of influence of the Project. The two sites are briefly described in Table 9.6 below.
Table 9.6 – Non-statutory Sites

<table>
<thead>
<tr>
<th>Site Name &amp; Designation</th>
<th>Direction &amp; Distance From Site</th>
<th>Brief Description of Designated Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tottenham Cemetery, All Hallows Churchyard and Bruce Castle Park SBI Grade II</td>
<td>c. 0.37 km west</td>
<td>A large area of open parkland, with veteran oak trees in the park, churchyard and cemetery. The cemetery contains a large pond with two islands that provide nesting site for common waterfowl.</td>
</tr>
<tr>
<td>Tottenham Hale to Northumberland Park Railsides SBI Grade II</td>
<td>c. 0.75 km east</td>
<td>A long stretch of vegetated railsides comprising a mosaic of grassland and scrub, with scattered silver birch <em>Betula pendula</em>. Some areas of woodland are present, dominated by sycamore <em>Acer pseudoplatanus</em>. Wurzell’s wormwood <em>Artemisia vulgaris x verlotiorum</em> is abundant around Northumberland Park. The site is inaccessible to the public and can only be viewed from adjacent paths or roads.</td>
</tr>
</tbody>
</table>

**Habitats and Flora**

9.3.6 The habitats present on the Project Site are shown on the Habitats Plan in Appendix 9.4.

9.3.7 The Project Site is bordered to the north by Lillywhite House, to the east by Worcester Avenue, to the South by Park Lane and to the west by High Road. At the time of survey the Project Site was bisected by Paxton Road, running west to east between High Road and Worcester Avenue. Approximately two thirds of the area of the site to the south of Paxton Lane is occupied by the existing football stadium, which contains habitat in the form of an intensively managed amenity grassland football pitch. The area to the west of the stadium is dominated by hardstanding with a row of predominantly multi-storey brick buildings at its western extent, along High Road. The single-storey Spurs Mega Store building occupies the south-west corner of this area.

9.3.8 The area of the site to the north of Paxton Road comprises two distinct areas, one to the north and one to the south. The southern area is dominated by a bare ground building site that is under colonisation in some areas by ephemeral/short perennial and tall ruderal vegetation. Located within this building site, in the middle and adjacent to the north of Paxton Road lies the Archway Sheet Metal Works and its associated industrial/warehouse-type buildings.

9.3.9 To the north of the Project Site is the northern development (of the previous application and now built out and operational), it is dominated by Lilywhite House/Sainsbury's, which has multiple turfed green roofs. To the east of this building is a row of terraced houses on Worcester Avenue (Nos. 2 – 32), all with rear gardens. All of these houses are off-site.

9.3.10 To the west of Lilywhite House/Sainsbury’s is a row of multi-storey town houses and office buildings along High Road. Two of these properties have rear gardens (Nos. 808 and 810 High Road).

9.3.11 A list of all plant species recorded during the 2015 extended Phase 1 Habitat survey of the site (accessible areas only) is provided in Appendix 9.4. All habitats present on site are discussed in turn.
briefly below.

Amenity grassland

9.3.12 Regularly managed amenity grassland is present in several locations on site including back gardens and the stadium pitch. The majority of these amenity grassland areas were dominated by perennial rye-grass *Lolium perenne*.

Trees

9.3.13 Mature and semi-mature trees are scattered around the Project Site. These are either located within paved areas to either side of the roads bordering the site, or present within the rear gardens of the houses in the north-west (properties 808-810) and north-east (properties 20-32) of the site. Almost all of the roadside trees are sycamore *Acer pseudoplatanus*, although a mature London plane *Platanus x acerifolia* tree is present on the corner of High Road and Brereton Road.

9.3.14 A mature red horse chestnut *Aesculus x carnea* tree is present in the car park to the rear of No. 800 High Road, in the north-west of the Project Site. A mature sycamore is present in the garden of No. 808 High Road.

9.3.15 Various semi-mature trees are present in the rear gardens of the terraces in the north-east of the Project Site, including cherry *Prunus* spp. and elder *Sambucus nigra*.

Ornamental planting

9.3.16 A limited range of ornamental shrubs and trees were recorded to the north of the Project Site including *Photinia x fraseri* ‘Red Robin’ - in large troughs to the east and west of Sainsbury’s – and birch *Betula* sp. saplings, planted on the roof of Lilywhite House.

9.3.17 Other ornamental species recorded in front gardens along High Road include yucca *Yucca* sp., bay *Laurus nobilis*, and rose *Rosa* sp.

Bare ground

9.3.18 The vast majority of bare ground habitat on site comprises the building site to the north of Paxton Road. Small areas at the margins of this bare ground have been sparsely colonised by a range of common ephemeral/short perennial and tall ruderal plant species including pineappleweed *Matricaria discoidea*, oilseed rape *Brassica napus*, shepherd’s purse *Capsella bursa-pastoris*, groundsel *Senecio vulgaris*, knotgrass *Polygonum aviculare*, dandelion *Taraxacum*, annual meadowgrass *Poa annua*, and red dead-nettle *Lamium purpureum*.

9.3.19 Colonising plant species were also recorded in other, small, areas of bare ground on site. Sowthistle *Sonchus oleraceus*, poppy *Papaver rhoeas*, hedge mustard *Sisymbrium officinale* and quaking grass *Briza maxima* were all recorded on bare ground in the front garden of No. 796 High Road. The front garden of No. 794 High Road has been colonised by cleavers *Gallium aparine*, bramble *Rubus fruticosus* agg., butterfly bush *Buddleja davidii*, willowherb *Epilobium* sp., herb Robert *Geranium robertianum*, spear thistle and creeping thistle.
9.3.20 Two shoots of Japanese knotweed were recorded growing at the southern end of the brick wall along the east side of the off-site astro-turf football pitch (see Target Note 1 on the Habitats Plan in Appendix 9.4. A stand of Japanese knotweed was also identified in the grounds of the school, c. 5 m to the east of the two shoots. All of the Japanese knotweed appeared to be under treatment with glysophate-based herbicide.

9.3.21 No Japanese knotweed was recorded in any of the areas accessed during the 2015 extended Phase 1 Habitat survey.

9.3.22 Roads, pavements and car parks within the Site boundary all comprise hardstanding.

9.3.23 All of the buildings on Site were assessed as part of the bat survey work and are therefore described in detail in Table 9.7 below.

9.3.24 The habitats present on site are only considered to be of potential value to bats and birds and therefore only records of these two taxa are discussed.

9.3.25 Several local bat records collated by the London Bat Group have been provided by GiGL for the data search area (see Appendix 9.1). These include a single record of a roost of pipistrelle Pipistrellus sp. bats, from c. 0.44 km west of the centre of the Project Site. Sightings of pipistrelle are recorded from c. 0.31 km west, c. 1.06 km north-east and c. 1.42 km south-east of the Project Site. The latter location to the south-east also has records of serotine Eptesicus serotinus and noctule Nyctalus noctula bats, and it is assumed that this corresponds with habitat along the River Lee corridor, which is likely to be valuable for bat foraging.

9.3.26 GiGL have provided a number of records of protected and notable bird species for the data search area. These include species specially protected under Schedule 1 of the Wildlife and Countryside Act 1981 such as hobby Falco subbuteo, kingfisher Alcedo atthis, black redstart Phoenicurus ochruros, fieldfare Turdus pilaris and redwing Turdus iliacus. The highly urbanised nature of the Project Site reduces its value to bird species, and no habitats are present that would typically support any of the Schedule 1 species listed above.

9.3.27 The small proportion of the Project Site comprising trees and residential gardens is likely to be used by bird species commonly associated with urban gardens.

9.3.28 Full descriptions of all of the buildings inspected on site during the June 2015 survey and an assessment of their potential to support bats are provided in Table 9.7 below.
Table 9.7 – Building Inspection Results

<table>
<thead>
<tr>
<th>Building Reference</th>
<th>Building description</th>
<th>External features/ evidence</th>
<th>Internal features/ evidence</th>
<th>Bat roost potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spurs Mega Store</td>
<td>Single-storey rendered brick building with shallow-pitched sheet metal roof over main shop and flat concrete/felt roofs on southern building extensions.</td>
<td>No external features or evidence.</td>
<td>Building well-sealed about the exterior, therefore not inspected internally.</td>
<td>Negligible</td>
</tr>
<tr>
<td>744</td>
<td>Warmington House. Grade II listed early C19 three-storey brick building. Access to roof void is via a staircase. Roof void has floor boards along centre of floor and is divided into three areas, with a semi-circular window at the southern end, letting in light. Tiled roof lined with intact bitumastic felt liner.</td>
<td>No external features or evidence. Roof tiles not visible from ground level due to parapet walls, but roof tiles appear well sealed on current aerial photographs.</td>
<td>No internal features or evidence.</td>
<td>Negligible – Void well-sealed and no obvious crevice-roosting opportunities</td>
</tr>
<tr>
<td>746</td>
<td>Three-storey red brick Edwardian local listed building with stone ground floor façade and an arched central entrance flanked by stone columns. Well-sealed slate tiled roof lined with sarking boards. No insulation in void.</td>
<td>No external features or evidence.</td>
<td>No internal features or evidence.</td>
<td>Negligible – No gaps in external tiling and no means of accessing void.</td>
</tr>
<tr>
<td>748</td>
<td>The Red House. Three-storey local listed late Victorian building constructed of red brick with a steeply pitched double gable ends to the High Road, slate roofs and tall red brick chimney stacks. Well-sealed double-pitched roof covered in thin slates. Void lined with bitumastic felt and sarking. Tiles well-sealed on single-storey extension to rear.</td>
<td>No external evidence. Missing ridge tile at southeast corner of northern pitched roof, however this is an unlikely roosting location as any emerging bats would be highly exposed to predators as they would exit over the Bill Nicholson Way car park.</td>
<td>Gaps in decorative brickwork at west end of north roof clearly used by sparrows to nest in the void, but no associated bat roosting evidence and no roosting evidence elsewhere in the void. Southern roof void not accessible.</td>
<td>Negligible – Gap caused by missing ridge tile highly unlikely to be attractive to bats. No evidence of bats accessing void via holes in decorative brickwork.</td>
</tr>
<tr>
<td>750</td>
<td>Three-storey local listed Victorian building constructed of red brick,</td>
<td>No external evidence. Missing roof tile on southern</td>
<td>No internal features or evidence.</td>
<td>Negligible - Gap caused by missing</td>
</tr>
<tr>
<td>Building Number</td>
<td>Description</td>
<td>Features</td>
<td>Likelihood of Suitable Roosting</td>
<td>Surveyability</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
<td>----------</td>
<td>---------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>505</td>
<td>Single storey brick building, glass front. Flat sheet material roof. No roof void.</td>
<td>No external features or evidence.</td>
<td>Building well-sealed about the exterior, therefore not inspected internally.</td>
<td>Negligible</td>
</tr>
<tr>
<td>794-802</td>
<td>Row of statutory listed three-storey Georgian buildings with pitched tiled roofs, many of which have low parapet walls.</td>
<td>No external features or evidence. All visible roof tiles appear well-sealed.</td>
<td>No access to survey interior.</td>
<td>Negligible</td>
</tr>
<tr>
<td>804-806</td>
<td>Three-storey Victorian buildings constructed of London stock brick with hipped slate roofs.</td>
<td>No external features or evidence. All visible roof tiles appear well-sealed.</td>
<td>No access to survey interior.</td>
<td>Negligible</td>
</tr>
<tr>
<td>808-810</td>
<td>Pair of four storey brick-built semi-detached Grade II* listed properties, dated to 1715.</td>
<td>No external features or evidence. All visible roof tiles appear well-sealed.</td>
<td>No access to survey interior.</td>
<td>Negligible</td>
</tr>
<tr>
<td>814</td>
<td>Two-storey local listed Victorian building constructed of red brick. Flat concrete roof with parapet wall.</td>
<td>No external features or evidence.</td>
<td>No access to survey interior.</td>
<td>Negligible</td>
</tr>
<tr>
<td>B1</td>
<td>Two-storey building constructed of red brick. Flat concrete roof with parapet wall.</td>
<td>No external features or evidence.</td>
<td>No access to survey interior.</td>
<td>Negligible</td>
</tr>
<tr>
<td>22</td>
<td>Brick-built terraced house with clay-tiled roof. No lining directly beneath tiles, but roof void lined with polythene, fastened between rafters. No insulation between ceiling joists.</td>
<td>Gaps beneath some tiles, but no associated bat droppings or grease staining.</td>
<td>No internal features or evidence. The plastic roof lining is affixed to the bottom of the rafters, leaving a draughty c. 10 cm gap between the clay tiles and the sheet. As a result no suitable roosting crevices are present.</td>
<td>Negligible - gap between plastic sheeting and unlined roof tiles is draughty and unsuitable for roosting bats.</td>
</tr>
<tr>
<td>No.</td>
<td>Property Description</td>
<td>Features</td>
<td>Evidence</td>
<td>Suitability</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------</td>
<td>----------</td>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>24</td>
<td>Brick-built terraced house with unlined, clay-tiled roof. Mineral wool insulation.</td>
<td>Gaps beneath some tiles, but no associated bat droppings or grease staining.</td>
<td>No internal features or evidence.</td>
<td>Negligible – roof void unlined and draughty. Unsuitable for roosting bats</td>
</tr>
<tr>
<td>26</td>
<td>Brick-built terraced house with new, well-sealed, clay-tiled roof.</td>
<td>No bat roosting features or evidence.</td>
<td>Not surveyed internally as tenanted, but no potential roosting opportunities presented by new roof.</td>
<td>Negligible – new roof is well-sealed and offers no roof access or crevice roosting features.</td>
</tr>
<tr>
<td>28</td>
<td>Brick-built terraced house with clay-tiled roof.</td>
<td>Gaps beneath some tiles, but no associated bat droppings or grease staining.</td>
<td>Not surveyed internally as tenanted. However it is understood that the roof void is not lined, as all buildings in the terrace are identical in layout and construction.</td>
<td>Negligible – roof void unlined and draughty. Unsuitable for roosting bats</td>
</tr>
<tr>
<td>30</td>
<td>Brick-built terraced house with clay-tiled roof. Roof void timber framed and completely unlined, therefore poorly insulated from external temperatures and wind.</td>
<td>Gaps beneath tiles.</td>
<td>No internal features or evidence.</td>
<td>Negligible – no internal roosting evidence and no crevice-roosting opportunities due to lack of roof lining.</td>
</tr>
<tr>
<td>32</td>
<td>Brick-built terraced house with clay-tiled roof. Roof void timber framed and mostly unlined save for one area at southern gable end. Void poorly insulated from external temperatures and wind.</td>
<td>Gaps beneath tiles, particularly large gaps at gable end where neighbouring house (No. 34) has been demolished.</td>
<td>No internal features or evidence.</td>
<td>Negligible – no internal roosting evidence and void too exposed to external weather conditions to be attractive to bats, as mostly unlined.</td>
</tr>
<tr>
<td>Archway Sheet Metal Works</td>
<td>Collection of breeze block/brick/metal-built workshops or varying height, typically with large glass-paned windows and metal sheet roofs containing skylights. Very light inside. Large metal warehouse on Paxton</td>
<td>No external features or evidence.</td>
<td>No internal features or evidence.</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
9.3.29 Given the highly urban context of the Project Site and the total lack of any bat roosting evidence recorded in association with any of the buildings inspected, all of the onsite accessible buildings inspected in June 2015 are considered to have negligible potential to support roosting bats.

Bats: Static Detector Surveys

9.3.30 The results of the static detector survey are presented in Table 9.8 below. The locations in which the static detectors were installed are shown on the Bat Survey Plan in Appendix 9.5.

<table>
<thead>
<tr>
<th>Location</th>
<th>Recording Period (2015)</th>
<th>Bat Species</th>
<th>Mean calls per hour</th>
<th>Total calls per recording period</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>June</td>
<td>Common pipistrelle</td>
<td>0.13</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>June</td>
<td>Noctule</td>
<td>0.27</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>June</td>
<td>Common pipistrelle</td>
<td>1.39</td>
<td>31</td>
</tr>
<tr>
<td>B</td>
<td>June</td>
<td>Soprano pipistrelle</td>
<td>0.22</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>June</td>
<td>Common pipistrelle</td>
<td>3.67</td>
<td>82</td>
</tr>
<tr>
<td>C</td>
<td>June</td>
<td>Soprano pipistrelle</td>
<td>1.79</td>
<td>40</td>
</tr>
<tr>
<td>C</td>
<td>June</td>
<td>Nathusius’ pipistrelle</td>
<td>0.04</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>June</td>
<td>Noctule</td>
<td>0.09</td>
<td>2</td>
</tr>
<tr>
<td>A</td>
<td>July</td>
<td>Common pipistrelle</td>
<td>0.04</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>July</td>
<td>Soprano pipistrelle</td>
<td>0.04</td>
<td>1</td>
</tr>
<tr>
<td>A</td>
<td>July</td>
<td>Noctule</td>
<td>0.48</td>
<td>11</td>
</tr>
<tr>
<td>B</td>
<td>July</td>
<td>Common pipistrelle</td>
<td>0.52</td>
<td>12</td>
</tr>
<tr>
<td>B</td>
<td>July</td>
<td>Soprano pipistrelle</td>
<td>0.09</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>July</td>
<td>Noctule</td>
<td>0.48</td>
<td>11</td>
</tr>
<tr>
<td>C</td>
<td>July</td>
<td>Common pipistrelle</td>
<td>6.41</td>
<td>147</td>
</tr>
<tr>
<td>C</td>
<td>July</td>
<td>Soprano pipistrelle</td>
<td>0.13</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>July</td>
<td>Noctule</td>
<td>0.61</td>
<td>14</td>
</tr>
<tr>
<td>C</td>
<td>July</td>
<td><em>Nyctalus</em> sp. bat</td>
<td>0.04</td>
<td>1</td>
</tr>
</tbody>
</table>
9.3.31 In overall terms, the above results reflect very low levels of bat activity around the Project Site, with a maximum of just 6.41 passes per hour, recorded at location C.

9.3.32 A total of at least four bat species were recorded by the detectors: common pipistrelle, soprano pipistrelle, noctule, Nathusius’ pipistrelle and a *Nyctalus* sp. bat.

9.3.33 The highest levels of bat activity were recorded by the SM2 bat detector in location C (428 passes across all species recorded), on the East Stand, facing out onto Worcester Avenue. The lowest levels of activity were recorded by the detector in location A (48 passes across all species recorded), within the construction compound.

9.3.34 In June, common pipistrelle bats were responsible for the largest number of passes (n=116), followed by soprano pipistrelle (n=45), noctule (n=8) and Nathusius’ pipistrelle (n=1). Common pipistrelle bats were also responsible for the largest number of passes in July (n=160), followed by noctule (n=36), soprano pipistrelle (n=6) and Nyctalus sp. bats (n=1). In August the largest number of passes was again recorded from common pipistrelle bats (n=184). Noctules were responsible for the second largest number of passes (n=28), followed by soprano pipistrelle (n=24) and Nathusius’ pipistrelle (n=1).

9.3.35 In all but three instances, the first bat to be recorded by any of the three SM2 bat detectors was recorded well after the typical emergence time for the species recorded. The three exceptions are a common pipistrelle recorded at 21.07 (8 minutes before sunset) by the detector in location C on 11 June; a common pipistrelle recorded at 21.42 (25 minutes past sunset) by the detector in location B on 10 July and a common pipistrelle recorded at 20.37 (26 minutes past sunset) by the detector in location C on 8 August. The timing of these recordings suggests that the bats in question emerged from roosting locations in the vicinity of the Site.

9.3.36 No bats were recorded at a time to suggest that they were returning to roost on site.

**Bats: Transect Surveys**

9.3.37 The transect routes are shown on the Bat Survey Plan in Appendix 9.5. A summary of the passes per min for each species recorded on each transect, across all three survey dates, is provided in Table 9.9 below, with full results tables provided in Appendix 9.6.
Table 9.9 – Transect Survey Results

<table>
<thead>
<tr>
<th>Transect point</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Survey minutes</td>
<td>Com. pip. pass/ min</td>
<td>Noctule calls/ min</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>35</td>
<td>-</td>
<td>0.03</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>30</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>30</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>35</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>35</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>-</td>
<td>0.05</td>
</tr>
</tbody>
</table>

9.3.38 Only two bat species were recorded during the transect surveys: common pipistrelle and noctule. No bats were recorded or seen by any of the surveyors during any of the three dusk transect surveys at a time to suggest that the bat had emerged from a roost on or near to the Project Site.

9.3.39 Common pipistrelles were only recorded at points 2 and 3 on transect route C, at the south end of Worcester Avenue, and were not recorded at any of the stopping points on transect routes A and B. A total of four common pipistrelle calls were recorded across 530 minutes of recording, giving an average rate of 0.008 bat passes/min (0.45 passes/hour) for the Project Site as a whole.

9.3.40 Noctules were recorded at stopping points 4 and 10 of transect route A; points 1, 4, 5 and 6 of transect route B; and at points 2, 4, 6, 7, 8 and 10 of transect route C. On every occasion that surveyors saw bats of this species, they were commuting high overhead and had clearly come from off-site roosts. A total of 17 noctule calls were recorded across 530 minutes of recording, giving an average rate of 0.032 bat passes/min (1.92 passes/hour) for the Project Site as a whole.

9.3.41 As per the results of the static detector survey work, the results of the transect surveys are indicative of very low levels of bat activity associated with the Project Site. No bats were observed during any of the surveys behaving in a way to suggest that they might be roosting on site, or that they rely on the Project Site as an important foraging location.

**Valued Ecological Receptors**

9.3.42 Potential Valued Ecological Receptors (VERs) have been evaluated and assigned a level of ecological value, as summarised in Table 9.10.
Wildlife sites

9.3.43 Both the Lee Valley SPA and Ramsar site and Epping Forest SSSI and SAC are considered to be VERs at the International level.

9.3.44 Walthamstow Reservoirs SSSI and Chingford Reservoirs SSSI are considered to be VERs at the National level.

9.3.45 Tottenham Cemetery, All Hallows Churchyard and Bruce Castle Park Site of Borough Grade II Importance, and Tottenham Hale to Northumberland Park Railsides Site of Borough Grade II Importance are both considered to be VERs at the Borough level, in accordance with their grading.

Habitats and Flora

9.3.46 No habitats listed under Schedule 41 of the NERC Act (2006) or either of the London or Haringey BAPs are present at the Project Site, with the exception of ‘built structures’, for which a Habitat Action Plan (HAP) exists as part of both BAPs, and ‘gardens’, for which a HAP exists as part of the Haringey BAP. The ‘built structures’ habitat does not have intrinsic ecological value, but is listed to acknowledge that some types of wildlife (e.g. bats and nesting birds) are dependent upon buildings and other structures. None of the remaining habitats present are considered to be of sufficient ecological value to qualify as VERs.

Fauna

9.3.47 Given the low/negligible ecological value of the habitats present on site and their isolation in a highly urban context, the Project Site is considered either completely unsuitable for or highly unlikely to support any notable or protected fauna other than common bird species, which may use the buildings and trees to nest and possibly bats, which again could roost in the buildings. Bats and nesting birds are therefore discussed in more detail below.

Bats

9.3.48 Very low levels of bat activity by at least four bat species were recorded as part of the transect and static detector surveys undertaken in 2015, these results and those of the building inspections do not suggest that bat species roost at, forage within or regularly commute through the Project Site. This conclusion is identical to that of the bat survey work carried out previously at the site in 2008. The local bat assemblage is therefore not considered to be a VER and does not require assessment.

Nesting Birds

9.3.49 The highly urbanised nature of the site reduces its value to bird species, and no habitats are identified that would typically support any notable species. Trees and buildings at the site are likely to be used for nesting by common bird species. Nesting by common bird species is considered to be of ecological value at the site level only and hence does not qualify as a VER.

9.3.50 During the 2014 nesting bird survey, a pair of kestrels (amber-listed Bird of Conservation Concern (BoCC); London Species of Conservation Concern (LSCC)) was recorded nesting in the lower rear half of the north stand monitor screen. A pair of starlings (red-listed BoCC; UK & London BAP Priority Species; LSCC) was also recorded nesting above a doorway into the stadium, beneath a concrete ledge. Although both species are of conservation concern, particularly in London, they are well-adapted to living in urban
environments and as such the nesting habitats on site are considered unlikely to be of significantly higher value than those available elsewhere in the vicinity of the Project Site. As such, nesting by both species is considered to be of ecological value at the site level only and hence does not qualify as a VER.

9.3.51 Appropriate mitigation measures will be implemented, as outlined below under ‘Additional Mitigation, Compensation and Enhancement Measures’, to comply with current legislation that protects nesting wild birds.

9.3.52 All wild birds, their nests and eggs are protected under subsection 1(1) of the Wildlife and Countryside Act 1981. It is an offence to kill or injure any wild bird, to take or destroy their eggs, or to take, damage or destroy their nests while in use or being built. As such, any demolition should be scheduled to occur outside of the bird breeding period (1 March – 31 July), or failing that, immediately following confirmation by a suitably qualified ecologist that birds are not nesting in the building/structure.

**Flying/Migratory Birds**

9.3.53 The Project proposals include several tall buildings (i.e. hotel, extreme sports centre and several residential buildings), which potentially could pose a collision risk to flying/migratory birds. The primary causes of significant bird collision with tall structures are large expanses of glass and night time illumination. The former because it renders buildings invisible by reflecting the sky, or by presenting an invisible barrier between the bird and vegetation it can see beyond the glass. The latter because excessive external illumination and light spill at altitude can cause migratory birds to become disorientated, as these species often rely upon the stars for navigation. In the case of the proposed high-rise buildings it is understood that none of these buildings presents any large expanses of glass, nor do they include large amounts of external illumination that would be likely to disorient migratory birds. To that end, the collision risk to flying/migratory birds is considered too low for their inclusion as a VER.

| Table 9.11 – Evaluation of Valued Ecological Receptors |
|-------------------------------|-------------|-----------------|
| **Receptor**                  | **Level of Ecological Value** | **Does the Receptor Qualify as a VER?** |
| Lee Valley SPA and Ramsar site| International | Yes             |
| Epping Forest SSSI and SAC    | International | Yes             |
| Walthamstow Reservoirs SSSI   | National     | Yes             |
| Chingford Reservoirs SSSI     | National     | Yes             |
| Tottenham Cemetery, All Hallows Churchyard and Bruce Castle Park SBI Grade II | Borough | Yes |
| Tottenham Hale to Northumberland Park Railsides SBI Grade II | Borough | Yes |
| Local bat assemblage – very low levels of activity recorded on site. No evidence to suggest the presence of onsite roosts, or that bats rely on the site in any way for foraging. | None | No |
| Nesting common birds          | Site         | No              |
| Nesting kestrel               | Site         | No              |
| Nesting starling              | Site         | No              |
9.4 **Inherent Design Mitigation**

9.4.1 Demolition will be timed to avoid the bird breeding period (1 May to 31 July), or failing that will take place immediately following confirmation by a suitably qualified ecologist that birds are not nesting in the buildings/structures to be demolished.

9.5 **Potential Environmental Impacts and Effects**

9.5.1 An effect is considered to be potentially significant if it could result in a change in the conservation status or degree of integrity of any VER.

9.5.2 Several non-statutory wildlife sites located within 1km of the site boundary qualify as VERs by virtue of their ecological value at the Local level or above.

**Construction**

*Wildlife Sites*

9.5.3 No statutory or non-statutory wildlife sites cover any part of the Project Site or occur on adjacent land. Given their significant distance from the site, the project is predicted to have no impacts during the construction phase on the ecologically valuable features of any of the identified sites.

**Occupation**

*Wildlife Sites*

**Lee Valley SPA & Ramsar Site and Walthamstow Reservoirs SSSI**

9.5.4 Walthamstow Reservoirs is the only unit of the SPA within 10km, at approximately 1.2km. Consultation with Natural England confirms that the SSSI is only notified for one of the bird species that the SPA is designated for, namely a nationally significant number of overwintering shoveler. Several additional wetland bird species also occur at nationally significant numbers, and gadwall occur in smaller numbers.

9.5.5 The reservoirs are owned and managed by Thames Water with public access by permit only. The wetland bird populations using the site are not particularly vulnerable to disturbance by its current use by anglers and birdwatchers. Any increase in visitor numbers from new residents of the Project is predicted to be minor and unlikely to have a significant effect on shoveler, gadwall or any other wildfowl species at the SPA/SSSI.

9.5.6 The Lee Valley forms a wetland corridor through the densely urbanised northern areas of Greater London, which has a roughly north-south orientation and is likely to provide a topographical feature for bird migration. Shoveler, gadwall and other wildfowl migrate to Walthamstow Reservoirs SSSI from summer breeding grounds in northern and eastern Europe. The Project Site occurs over 1km to the west of the SSSI and river corridor. It is considered highly unlikely that the construction of tall buildings and the use of artificial light sources at the Project Site would have any significant effect on the migratory routes of wildfowl using the SPA. In summary, no effects to the integrity of the SPA/SSSI are predicted as a result of this project.

**Epping Forest SSSI and SAC**

9.5.7 This site is primarily notified for its woodland habitat types and population of stag beetle, although it also
contains smaller areas of internationally important heathland habitats. These qualifying features are sensitive to recreational pressure and nitrogen deposition caused by local traffic emissions.

9.5.8 The SAC/SSSI is approximately 4.6km from the Project Site at its closest point, and is a large linear site extending over 12km in length. At this distance, no significant operational impacts are predicted from the increase in visitor numbers to, or additional traffic in the vicinity of, the SAC/SSSI. No significant effects to the habitats or species that the SAC/SSSI is designated for are predicted as a result of this project.

**Chingford Reservoirs SSSI**

9.5.9 The SSSI comprises the King George V and William Girling Reservoirs, both owned by Thames Water. The reservoirs are one of the major wintering grounds for wildfowl and wetland birds in the London area and hold nationally important numbers of some species.

9.5.10 Public access is only allowed to the King George V Reservoir (North and South basin) and requires a permit from Thames Water. The wetland bird populations that make use of this reservoir are unlikely to suffer significant effects resulting from the project, as the only recreational use of the reservoir is by the King George Sailing Club (under permit from Thames Water) and birdwatchers, who are by definition unlikely to have any effect on these bird populations.

9.5.11 No significant effects to the habitats or species supported by the William Girling Reservoir are predicted, as there is no public access to this part of the SSSI.

9.5.12 Any increase in visitor numbers from new residents of the Project is predicted to be minor and unlikely to have a significant effect on any bird species at the SSSI.

**Non-statutorily Designated Sites**

9.5.13 The project is likely to increase visitor numbers to the closest SINC of Tottenham Cemetery, All Hallows Churchyard and Bruce Castle Park. This site comprises open parkland that is reportedly visited by over 100,000 people per year. With this number of visitors the SINC is not considered to contain any wildlife habitats or species that are particularly sensitive to disturbance and the potential minor increase in recreational use from the project is considered to have a negligible effect on the ecological value of the site.

9.5.14 There is no public access to Tottenham Hale to Northumberland Park Railsides SINC and no effects from the project are likely.

9.5.15 No adverse effects to VERs are identified and therefore no significant effects, i.e. effects that would be likely to result in a change in conservation status or degree of integrity of any VER, are considered likely from the project.

**9.6 Additional Mitigation, Compensation and Enhancement Measures**

**Mitigation**

9.6.1 No potentially significant effects are predicted to any VER as a result of the project and therefore, based on the available survey information, no mitigation measures are required.

9.6.2 Potential legal issues have been identified concerning features that do not qualify as VERs, namely the
likely presence of nesting birds at the site.

9.6.3 All wild birds, their nests and eggs are protected under subsection 1(1) of the Wildlife and Countryside Act 1981, making it an offence to kill or injure any wild bird, to take or destroy their eggs, or to take, damage or destroy their nests while in use or being built.

9.6.4 Any demolition on site will be scheduled to occur outside of the bird breeding period (1 March – 31 July), or failing that, immediately following confirmation by a suitably qualified ecologist that birds are not nesting in the buildings/structures.

Compensation

9.6.5 No potentially significant effects are predicted to any VER as a result of the project and therefore no compensation measures are required.

Enhancement

9.6.6 The provision of new habitats and/or features for wildlife would provide biodiversity gains, in line with guidance within the NPPF, London Plan Policy 7.19, Haringey Policy SP13 and the UK, London and Haringey BAPs.

9.6.7 Green roof

9.6.8 The Project will incorporate areas of green and brown roof to offer a significant biodiversity enhancement. Extensive sedum roofs are proposed for the new Health Centre in the north-east of the Project Site and also on the southern portion of the Tottenham Experience building. In addition, green and brown roofs are proposed on the new residential towers in the south-east of the Project Site, as part of roof gardens and Community Amenity Space. The installation of these roofs will attract a range of invertebrates and generate seeds, which should provide food sources for local bat and bird species. Certain areas of green roof habitat may also provide nesting opportunities for bird species.

9.6.9 New tree and shrub planting will be included within the landscape scheme for the site. The nature of this Project means that high levels of pedestrian traffic and the demands of CCTV coverage impose constraints on the extent and type of planting that can be provided. However, the planting of native species of local provenance and other shrub species of known benefit to wildlife will be provided where possible. These could include nectar-rich species to attract invertebrates and fruit bearing species to provide food for birds.

9.6.10 The 2014 nesting bird survey recorded pairs of starling and kestrel nesting at the site, and replacement nesting opportunities will be provided. Two new kestrel nest boxes will be provided in appropriate locations on new buildings at the Project Site. Additional bird boxes will also be provided to offer new potential nesting sites, with a wide range of suitable products available for buildings such as sparrow terraces and swift boxes. The final selection of boxes should take into account the species recorded from the 2014 nesting bird survey, in particular starling.

9.6.11 The results of the bat surveys suggest that the site is of no real significance to bats, and siting bat boxes across the majority of the new Project is unlikely to be successful at attracting bats. However, bat commuting/foraging activity was recorded along Worcester Avenue, next to the East Stand of the existing stadium. Bat roosting units located on new buildings in this location have the highest potential to be
occupied. Four bat roosting units will be installed in appropriate location on the eastern wall of new buildings in the south-east corner of the Site.

9.7 Assessment Summary and Residual Environmental Impacts and Effects

9.7.1 No potentially significant effects are predicted to any VER as a result of the Project and therefore no residual environmental impacts or effects are anticipated.

Cumulative Effects

9.7.2 No potentially significant effects are predicted to any of the wildlife sites identified as VERs, as none of these sites is particularly vulnerable to increases in recreational pressure and all of them are sufficiently far from the Project Site to avoid any significant effects during the construction phase. As a result, no significant cumulative effects are anticipated as a result of the construction of any of the identified committed developments.
10. Surface Water Drainage and Flood Risk

10.1 Introduction

10.1.1 This chapter of the ES has been produced by AECOM Infrastructure and Environment UK Ltd (AECOM) and addresses the potential surface water drainage and flood risk effects the project may have on the area surrounding the Project Site. The assessment includes a summary of the current conditions found within the area and identifies mitigation measures where appropriate for significant effects that may arise as part of the Project.

10.2 Assessment Criteria and Methodology

Previous Assessment

10.2.1 An ES was produced for the May 2010 planning application for the redevelopment of the existing Tottenham Hotspur Football Club and adjacent area, north of known as Wingate (disused) industrial site.

Scoping Opinion

10.2.2 The scoping has identified the need to include surface water drainage and flood risk in the environment statement. Whilst the Scoping report was not formally issued to the Council a draft Scoping request was issued and comments were received in relation to the Scope set out in that document.

Legislative Context

10.2.3 The Water Resources Act 1991 sets out the main regulatory controls and restrictions that provide protection to the water environment through controls on abstractions, impoundment and discharges. The Act also identifies, among other things, conservation, water quality and drought provisions. It also identifies exemptions such as Section 29 where, for example, in order to prevent interference with building operations, groundwater can be abstracted without an abstraction licence by construction projects. It should be noted that even in this case the Environment Agency must still be notified under Section 30.

10.2.4 The Water Resources Act 1991 was amended by the introduction of the Water Act 2003 which modernised the regulations of water resources and abstraction and updated most of the Water Resources Act.


10.2.6 The Water Resources Act is supplemented by other regulatory controls, such as:

- The Flood and Water Management Act 2010;
- The Environment Act 1995, which established the Environment Agency; and
- The Environmental Protection Act 1990, which provides for integrated pollution control measures.
10.2.7 A number of regulations have since been implemented to enact the previously mentioned statutory law. These regulations include:

- Water Resources (Environmental Impact Assessment) (England and Wales) Regulations 2003;
- The Anti-Pollution Works Regulations 1999;
- The Control of Pollution (Oil Storage) (England) Regulations (2001);
- The Environmental Damage Regulations (2009);
- The Water Resources Act (Amendment) (England and Wales) Regulations (2009);
- The Environmental Permitting (England and Wales) Regulations (2010) which control discharge of water to surface water and groundwater; and

10.2.8 The Flood and Water Management Act 2010 is largely aimed at delivering the recommendations of the Pitt Review following the 2007 floods whose key recommendations include the use of sustainable drainage systems, SuDS.

- The Act amends section 106 of the Water Industry Act 1991 to make the right to connect surface water runoff to the Public sewers conditional on approval of the drainage system by the approving body. The automatic right for foul sewer connections is retained;
- In a consultation document entitled “Delivering Sustainable Drainage Systems” September 2014, the Department for the Environment Food and Rural Affairs and the Department for Communities and Local Government jointly announced that responsibility for approving and maintaining SuDS would fall to the planning system and local planning authorities. Schedule 3 of the Flood and Water Management Act 2010 would not be implemented; and
- A further consequence of the Flood and Water Management Act 2010 is that responsibility for the local management of flood risk from surface water and groundwater flooding now lies with the Lead Local Flood Authority, which for the Project Site is the London Borough of Haringey. It is also responsible for managing flood risk from ordinary watercourses, whilst the Environment Agency remains responsible for managing the flood risk from the sea and from main rivers. The Moselle Brook is a “main river” and is along the west side of the Project Site adjacent to the High Road. It is culverted under the High Road from the junction with White Hart Lane to Scot Gardens (approx. 900m) and then it turns in an easterly direction and discharges into the Pymmes Brook.

10.2.9 Schedule 4 of the Flood and Water Management Act 2010 made a number of changes to the Reservoir Act 1975. The changes came into force in England in July 2013.

- A large reservoir is high risk if the Environment Agency thinks that in the event of an uncontrolled release of water from the reservoir, human life could be endangered; and
- For large high risk reservoirs, at least once every 12 months, supervising engineers must provide a written statement to the reservoir owner or operator of any steps taken to maintain it.
National Planning Policy and Guidance


10.2.10 The National Planning Policy Framework (NPPF) outlines the Government's planning policies for England. The NPPF sets out the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations. On 6th March 2014, the Government published its National Planning Practice Guidance, a web-based resource to support the NPPF. The NPPF sets out 12 planning principles as guidance for local councils for the creation of their local plan; the following principles are directly applicable to the water environment:

"Meeting the challenges of climate change, flooding and coastal change - support transition to a low carbon future in a changing climate taking full account of (inter alia) flood risk and coastal change; and Conserving and enhancing the natural environment - development should minimise pollution and other adverse impacts on the local and natural environment and should plan positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure."

10.2.11 The NPPF requires that Local Planning Authorities to only consider development in flood risk areas where, informed by a site-specific Flood Risk Assessment, FRA, following the Sequential Test (which ensures that a sequential approach is followed to steer new development to areas with the lowest probability of flooding) and if required the Exception Test (which is a method to demonstrate and ensure that the flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available) it can be demonstrated that:

- Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location;
- The development is flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed; and it gives priority to the use of sustainable drainage systems; and
- Residual risks that remain after applying the sequential approach can be safely managed.


10.2.12 The National Planning Practice Guidance (NPPG) provides additional advice and technical information on how planning can and should take account of the risks associated with flooding and coastal change in plan-making and the planning application process, to ensure the effective implementation of the policies in the NPPF. This Flood Risk and Coastal Change guidance section provides further information on the application of the Sequential and Exception Tests and the technical scope of site-specific Flood Risk Assessments.

10.2.13 The NPPG also contains guidance in relation to water supply, wastewater and water quality and provides advice and information on how planning can and should protect water quality and ensure the delivery of adequate water and wastewater infrastructure for new development.
Regional Planning Policy

The London Plan (2015)

10.2.14 The London Plan (2015)\textsuperscript{27} is the overall strategic development plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2036.

10.2.15 Policy 5.11 is about GREEN ROOFS AND DEVELOPMENT SITE ENVIRONS and states:

“Major development proposals should be designed to include roof, wall and site planting, especially green roofs and walls where feasible, to deliver as many of the following objectives as possible:

- adaptation to climate change (i.e. aiding cooling);
- sustainable urban drainage;
- mitigation of climate change (i.e. aiding energy efficiency);
- enhancement of biodiversity;
- accessible roof space;
- improvements to appearance and resilience of the building; and
- growing food.”

10.2.16 Policy 5.12 is about FLOOD RISK MANAGEMENT and states:

“Development proposals must comply with the flood risk assessment and management requirements set out in the NPPF and the associated technical Guidance on flood risk\textsuperscript{1} over the lifetime of the development and have regard to measures proposed in Thames Estuary 2100 (TE2100 – see paragraph 5.55) and Catchment Flood Management Plans.”

10.2.17 Policy 5.13 is about SUSTAINABLE DRAINAGE and states:

“A Development should utilise sustainable urban drainage systems (SuDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

1. store rainwater for later use
2. use infiltration techniques, such as porous surfaces in non-clay areas
3. attenuate rainwater in ponds or open water features for gradual release
4. attenuate rainwater by storing in tanks or sealed water features for gradual release
5. discharge rainwater direct to a watercourse
6. discharge rainwater to a surface water sewer/drain
7. discharge rainwater to the combined sewer.”

Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation.”

10.2.18 The above hierarchy reflects the intent of the Flood and Water Management Act 2010.

10.2.19 Guidance\textsuperscript{28} has been produced by the Mayor of London to aid developers in meeting the policies stating

\textsuperscript{27} London Plan 2015, \url{http://www.london.gov.uk/sites/default/files/London%20Plan%20March%202015%20(FALP).pdf}

\textsuperscript{28} (2014) Sustainable Design and Construction, Supplementary Planning guidance, Major of London
that (3.4.8):

“Most developments referred to the Major have been able to achieve at least 50% attenuation of the site’s (prior to re-development) surface water runoff at peak times. This is the minimum expectation from the development proposal.”

10.2.20 It also states (3.4.10):

“On previously developed sites, runoff rates should not be more than three times the calculated greenfield rate”. There are two exceptions to this rule (i) where the surface water is to tidal water and (ii) when there is the use of pumped discharge.”

Local Planning Policy

Current Planning Policy

10.2.21 On 18 March 2013, Haringey’s Local Plan

10.2.22 Policy SP5: WATER MANAGEMENT AND FLOODING states:

“The Council will require all development in Haringey to be water efficient during construction and operation and to reduce all forms of flood risk. All development shall:

- Improve the water environment, water quality and drainage systems;
- Minimise water use and illustrate how development would contribute to general and flash flooding;
- Take account of flood risk vulnerability classification as set out in paragraph 100 of the NPPF and will apply the NPPF Sequential Test and Exception Test;
- Implement measures to prevent (or mitigate as last resort) local surface water and downstream flooding;
- Implement Sustainable Drainage Systems from strategic to individual site level to improve water attenuation, quality and amenity;
- Restore and enhance the Blue Ribbon Network including Pymmes Brook, Moselle Brook, the River Lee and its tributaries, deculverting wherever feasible, to improve water quality and amenity of these waterways and to help reduce flood risk (in line with London River Action Plan); and
- Require higher resilience and levels of flood protection for critical infrastructure to ensure the protection of essential services such as water and power.”

10.2.23 In order to facilitate this, the Council:

- Has carried out a joint SFRA (Strategic Flood Risk Assessment) Stage 1 for the whole borough;
- Has carried out a Sequential Test for the Areas of Development (Growth Areas and Areas of Change); and
- Is carrying out, in association with other north London Boroughs in the Drain London sub-region, a Surface Water Management Plan to identify issues with drainage networks and the effects of new development.

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29 (2013) Haringey’s Local Plan Strategic Policies 2013 to 2026, Haringey’s Spatial Strategy, Chapter 2-4
10.2.24 The Project is in the Critical Drainage Area, CDA, Group 4_061, “Tottenham High Road and area surrounding Halefield Road, Tottenham” as defined by the Surface Water Management plan 2011. Eight CDAs have been identified and five were identified as priority CDAs. Group 4_061 was not identified as a priority CDA. The Surface Water Management Plan describes this CDA as “Surface water is observed to pond around Halefield Road as a result of overland flow from the west. Ponding water is also observed at the low point along Tottenham High Road. The largest depths of water occur along the roads with some residential properties and their back gardens flooded.” Validation: “There is good correlation between the modelling results and the EA Surface Water Maps for both 30 year and 200 year event. There are no other supporting flood records in the area.”

10.2.25 As a Lead Local Flood Authority and Local Planning Authority, the London Borough of Haringey has produced a Level 2 Strategic Flood Risk Assessment, February 2015, to contribute to the evidence base for the London Borough of Haringey’s Local Development Documents (LDDS) in accordance with the National Planning Policy Framework.

Emerging Planning Policy

10.2.26 Due to the extent of the flooding risk in Haringey it is important to have a Multi-Agency Flood Plan, MAFP, to ensure a coordinated response to a flood event within the London Borough of Haringey. This plan has been written in accordance with national guidance and only contains actions related to flood events. This Multi-Agency Flood Plan covers the response to flood risks; it does not cover a response to burst water mains or foul sewage floods, although these are noted as a potential risk. The Project is adjacent to the Tottenham Flood Zone as defined in the MAFP.

Guidance/ Best Practice

10.2.27 The Environment Agency Pollution Prevention Guidance Notes (PPG) provide advice on statutory responsibilities and good environmental practice. The Guidance Notes of particular relevance to the Project include:

- PPG 1: General Guide to the Prevention of Pollution which provides an introduction to pollution prevention and the pollution prevention guidance notes;
- PPG 2: Above Ground Oil Storage Tanks which provides guidance to those responsible for the storage of oil on construction sites;
- PPG 3: Use and Design of Oil Separators in Surface Water Drainage Systems;
- PPG 5: Works and maintenance in or near water;
- PPG 6: Working at Construction or Demolition Sites is a document that mirrors much of PPG 5 but with particular emphasis on the situations likely to occur at demolition and construction sites;
- PPG 7: Refuelling Activities, which provides information on the correct delivery, storage and dispensing of fuel to help reduce the risk of pollution; and
- PPG 21: Pollution Incident Response Planning assists those developing site-specific pollution

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31 JBA Consulting (2015), Haringey Council Strategic Flood Risk Assessment, Draft Report
incidents response plans to prevent and mitigate damage to the environment caused by accidents such as spillages and fires.

10.2.28 Guidance C532 “Control of Water Pollution from Construction Sites” brings together the guidance above but goes into more detail with regard to sources of water on construction sites, pollutants and pathways in addition to providing guidance on planning for the type and location of suitable control measures.


10.2.30 Defra has published Non Statutory technical standards for Sustainable Drainage Systems in March 2015. The guidance should be used in conjunction with the National Planning Policy Framework and Planning Practice Guidance. Standards 7, 8 and 9 refer to “Flood risk within the development”:

- S7 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event;
- S8 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development; and
- S9 The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.

Baseline Data Collection

10.2.31 Baseline conditions have been established through a desk study and via consultation with the following bodies:

- Environment Agency (correspondence included within FRA); and
- Thames Water (TW) (correspondence included within FRA).

10.2.32 Additional data and reports have also been collected from the following sources:

- Environment Agency website;
- URS Flood Risk Assessment (2010);
- London Borough of Haringey website; and

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33 DEFRA Non Statutory technical standards for Sustainable Drainage Systems March 2015
Assessment Methodology determining Construction and Occupation Effects

10.2.33 Throughout the construction phase and occupation phase of the Project there are potential sources of pollution / contamination in addition to the construction process itself that may potentially affect water resource and flood risk receptors; these are identified using the source-pathway-receptor model. For each of the sources / processes, there are particular ‘triggers’ - these are on-site actions that cause the potential for significant effects.

10.2.34 The likely pathways between the source of contamination or demolition and construction process and the associated water resource feature or attribute have been identified. The potential effects (pre-mitigation) have been assessed and stated, and are fundamentally the result of the interaction between the contamination source / process and the water resource feature, via a defined pathway.

Significance criteria

10.2.35 The degree of the effects of the Project on drainage and flood risk have been determined from the interaction of the sensitivity of identified receptors and impact magnitude, as follows:

- Drainage and flood risk resources / features / receptors have been identified and their value, importance or sensitivity to change have been determined and categorised from the range of scale from very high to negligible. See Table 2.1;
- Potential impacts that will affect any identified resource / receptor have then been determined and their magnitude, scale or severity assessed and categorised from very high to negligible. See Table 2.2; and
- The significance of the effects caused by the identified impacts on the resource / receptors has then been assessed using a matrix (see Table 2.2) and categorised as either substantial, major, moderate minor or neutral. The definition of the categories of the effect significance is given in Table 2.3.

10.2.36 Potential impacts as a result of the Project have been considered for both the construction occupation phases of the Project.

Geographical Scope

10.2.37 The assessment will cover the water bodies which are connected hydraulically to the Project Site, e.g. the Moselle Brook and the Thames Water Sewers adjacent to the site.

Assumptions and Limitations

10.2.38 The assessment is a desk top study and is based on data reviewed for the baseline conditions.

10.2.39 The potential effects of the construction works are assessed based on the assumption of a reasonable worst-case scenario.

10.2.40 Where there is uncertainty regarding a process or receptor, for example relating to the classification of an aquifer, or soils, a reasonable worse-case scenario in terms of vulnerability/sensitivity has been assumed.

10.2.41 In order to ensure that the reasonable worst-case conditions have been assessed with respect to
10.3 Baseline Conditions

Surface Water

10.3.1 There are no surface watercourses within the Project Site boundary, however Moselle Brook has been culverted and the culvert lies beneath High Road immediately west of the Project Site.

10.3.2 In accordance with the findings of the North London Strategic Flood Risk Assessment\textsuperscript{34}, Moselle Brook was “originally a natural tributary of the River Lee but has since been mostly culverted and in now artificially flows into Pymmes Brook”. The culvert outfalls into the Pymmes Brook approximately 1.9 km southeast of the project site. Pymmes Brook joins the Thames River approximately 12km south of the Project Site.

10.3.3 The River Thames drains a catchment area extending to approximately 12,936km\textsuperscript{2}. The Thames catchment is one of the driest in Great Britain with an average annual rainfall of 690mm, approximately 250mm of which contributes to river flows and groundwater recharge. The remainder is lost to evapotranspiration.

10.3.4 The freshwater section of the River Thames receives water from 38 tributaries including the rivers Churn, Leach, Cole, Windrush, Evenlode, Cherwell, Ock, Thame, Pang, Kennet, Loddon, Coin, Wey and Mole. Downstream of Teddington, the tributaries include the rivers Brent, Wandle, Ravensbourne, Lee, Darent and Ingrebourne. The River Thames also receives waste and stormwater discharge from a population of over 12 million people.

Surface Water Quality

10.3.5 The River Thames forms part of the River Thames and Tidal Tributaries Site of Metropolitan Importance (SMI) for nature conservation. From the 1950s onwards, the water quality in the River Thames has been consistently improving, mainly as a result of improved effluent discharge management and improvement in the quality of industrial and sewer discharges. The water quality of the River Thames today is considered sufficient to support a wide range of flora and fauna. A good indicator of water quality is the salmon population, which has been growing steadily.

10.3.6 The waters of the River Thames run the greatest risk of pollution during the summer months, when the river flows are at their lowest. During low flows, the water is not sufficient to dilute the discharge loads from the combined sewer overflows, which comprise both storm and wastewater.

10.3.7 Effluent from the combined sewer overflows serves to increase biological oxygen demand and decrease the dissolved oxygen content of the River, both of which decrease the water’s potential to support fish life. In severe circumstances, the dissolved oxygen content may drop as low as zero, potentially resulting in fish deaths. In order to prevent oxygen depletion, TWUL runs a number of oxygenating vessels that can pump up to 30 tonnes (t) of oxygen directly into the River per day.

10.3.8 The 2013 WFD classification for Moselle Brook gives the ecological status as “Moderate” and states that it is a “Heavily Modified Water Body”, HMWB. The objective set in the 2009 River Basin Management

\textsuperscript{34} Mouchel, 2008, “North London Strategic Flood risk assessment” (Prepared for the North London Waste Plan)
Plan is “Good Ecological Potential” by 2027.

**Surface Water Abstraction and Discharges**

10.3.9 The 2013 WFD classification for the Moselle Brooke states that the flow is not impacted by abstraction.

10.3.10 The Environment Agency does not have any consented surface water discharges or licensed surface water abstraction points within 1000m of the Project Site. Under the Water Act 2003, abstractions equal or less than 20 cubic metres per day were deregulated as of 1 April 2005 hence the Environment Agency does not hold records below this level.

10.3.11 The Moselle Brook discharges into the Pymmes Brook which then flows into the River Lee, a tributary of the River Thames. The River Thames is of high importance for wastewater overflows. Thus any activity that would reduce baseflow to the River Thames and/or flow rates and thus the dilution available would have a major adverse impact on the quality of the receiving waters.

**Groundwater**

10.3.12 The Environment Agency Source Protection Zones (SPZ) maps show that the Project Site is mostly within the outer zone of a groundwater SPZ. The northwest corner is outside the groundwater SPZs. The Source protection Outer zone (Zone 2) is defined by a 400 day travel time from a point below the water table to the abstraction point.

10.3.13 Map 12 'Groundwater Contours' in Appendix A of the North London SFRA indicates that the groundwater in the region is between 10m and 20m below ground level.

10.3.14 A review of the groundwater vulnerability map for the Project Site indicates that the south-eastern third of the Project Site is located over a non-aquifer of negligible leaching potential. Non-aquifers are described as formations that are generally regarded as containing insignificant quantities of groundwater. Groundwater flow through such rocks, although imperceptible, does take place and should be considered in assessing the risk associated with persistent pollutants. The north-western two thirds of the Project Site are located over a minor aquifer of high leaching potential. Minor aquifers are either fractured or potentially fractured rocks, which do not have a high primary permeability, or formations of variable permeability including unconsolidated deposits. Although minor aquifers rarely produce large quantities of water for abstraction, they are important for local supplies and in supplying base flow to rivers. Soils of high leaching potential have the potential to allow pollutants to move rapidly. For the Project Site enabling works, much of the gravel has already been extracted.

10.3.15 The BGS soil and drift map for North London (Sheet 256) indicates that the south-eastern third of the Project Site is underlain by Brickearth (Enfield Silt), which overlies Kempton Park Gravel. Kempton Park Gravel overlies London Clay, which in turn overlies Lambeth Group, the Thanet Sand formation and then lastly Chalk. The northwest two-thirds of the Project Site underlain by the same strata as the south east third beginning with the Kempton Park Gravel layer.

10.3.16 Further details of the ground conditions beneath the Project Site can be found in Chapter 11.

10.3.17 The deeper groundwater, located in the Chalk aquifer beneath the London Clay, was rising as a result of decreased abstraction. In response to this situation, TWUL, London Underground Limited (LUL) and the Environment Agency formed GARDIT (General Aquifer Research Development and Investigation Team).
in 1992. GARDIT have since been attempting to mitigate the problem by increasing groundwater abstraction in London by up to 50 million litres per day (Ml/d). It is now considered\textsuperscript{35} that the water level has been stabilised.

10.3.18 There is considerable depth between the groundwater levels and any underground structures. However, if the groundwater were to rise it could lead to the re-saturation of the London Clay. This could result in a reduction in its load bearing capacity, a reduction of skin friction of piles and differential heave affecting the foundations of buildings. Water levels in the shallow aquifer are unlikely to be affected by any rise in groundwater levels in the Chalk aquifer.

**Groundwater Quality**

10.3.19 The deep groundwater is the principal aquifer of the Thames region and is classified as a major aquifer. At the Project Site, it is expected that the confining London clay and Lambeth Group formations would act as a barrier between surface pollutants and the deep aquifer.

10.3.20 Haringey Council has advised that there are no premises/sites in Haringey registered as contaminated land under Part IIA of the Environmental Protection Act 1990.

10.3.21 The WFD quantitative status of the chalk aquifer ground water is poor\textsuperscript{36}.

**Groundwater Abstraction and Discharge**

10.3.22 The Environment Agency does not have any consented ground water discharge points within 1000m of the Project Site but there is a Licence ground water abstraction point along Garman Road which is within 1000m of the Project Site for laundry use. Under the Water Act 2003, abstractions equal or less than 20 cubic metres per day were deregulated as of 1 April 2005 hence the Environment Agency does not hold records below this level.

**Underground / Lost Rivers**

10.3.23 Based on a study of existing data and the geological maps of the Project Site, it is not considered likely that there are any lost rivers beneath the Project Site.

**Existing Drainage Network**

10.3.24 The Moselle Brook is classified as main river and is culverted under White Hart Lane and then flows south in a culvert parallel to the High Road. The Thames Water Services utility drawings show Moselle Brook to the west side of the High Road. The High Road is along the western boundary of the Project Site.

10.3.25 The Thames Water Services maps show the approximate location of public surface water and foul sewers and water mains adjacent to the Project Site. Based on these maps the nearest public sewers are separate surface water and foul sewers located beneath all roads surrounding the Project Site and beneath Paxton Road that crosses through the Project Site.

10.3.26 The Thames Water surface water sewer along Northumberland Park drains into the Thames Water


surface water sewer under the High Road which drains south into the Moselle Brook at the junction of White Hart Lane and the High Road. There are short sections of Thames Water surface water sewers that drain from the Project site across the High Road directly into the Moselle Brook. The sewer along Paxton Road drains into the Moselle Brook. The Thames Water sewer along Park Lane drains eastward and the Thames Water surface water sewer along Worcester Avenue drains into the surface water sewer beneath Park Lane. An overflow from the Moselle Brook enters the top end of the Thames Water surface water sewer along Park Lane.

10.3.27 Internal, private surface water sewers convey the surface water from within the Project Site to the Thames Water surface water sewer mains beneath the surrounding roadways.

Flood Risk

10.3.28 The flood risk assessment has been prepared by AECOM for the planning application and is included in Appendix 10.1.

10.3.29 The Environment Agency website indicates that the majority of the Project Site is located in Flood Zone 1 having a low probability or less than 1 in 1000 annual probability of river flooding in any year (<0.1%). The western edge of the scheme that abuts High Road is located in Flood Zone 2 having a medium probability or between a 1 in 100 and 1 in 1000 annual probability of river flooding in any year (1% - 0.1%). The Environment Agency has supplied TUFLOW modelled flood levels for Moselle Brook adjacent to the Project Site for the extents of Flood Zone 2. Predicted 1:1000 yr event flood levels range from 11.6m AOD (at the junction of White Hart Lane and High Road) at the north west corner of the Project Site to 10.99m AOD (at the junction of Park Lane and the High Road) at the southwest corner of the Project Site.

10.3.30 The FRA concludes that the Project Site is not at significant risk of fluvial flooding during normal or even extreme storm events.

10.3.31 The National Reservoir Inundation maps\(^5\) show that the low lying areas in the south east of the Project Site and along the roads adjacent to the Project Site are in the Haringey Reservoir Flood outline. The reservoirs are strictly inspected and monitored.

10.3.32 The Project Site is outside the extents of various historic flood events.

10.3.33 In the Surface Water Management Plan\(^4\), 2011, only one Thames Water sewer flooding was reported with a postcode of N17 which was for a 1 in 10 year event.

10.3.34 In April 2012, flooding occurred on High Road Tottenham. Anecdotal evidence suggests that this was due to blocked drains in the area\(^5\).

10.3.35 There has not been any evidence of groundwater flooding on or near the Project Site.

10.3.36 The Strategic Flood Risk Assessment\(^5\) 2015 summaries the flood risk in Haringey as: “Surface water runoff is the source of flood risk that potentially has the greatest effect in Haringey and is the flooding most likely to be experienced. There is also significant residual risk as a result of reservoir breach effecting large areas of the borough which is much less likely to be experienced, but the consequences would be significant.”
10.3.37 It is considered that the Project Site is at minor risk of fluvial flooding from the culverted Moselle Brook and at minor risk of sewer flooding from the Thames Water sewerage network, groundwater and overland flow and from reservoir breaches.

Receptor sensitivity
10.3.38 A summary of the groundwater resources and surface water resources receptors sensitivity and WFD status Table 10.2 and 10.3

Consultation
10.3.39 The Environment Agency, EA, was consulted for the 2010 drainage strategy and they agreed in principle that the discharge from the Project could be 150 l/s/hectare. The 2010 application met this target.

10.3.40 The EA have been consulted for the revised FRA for flooding data. The EA have produced flood maps and flood levels similar to those used in the 2010 FRA.

10.3.41 Thames Water was consulted for the 2010 drainage strategy and stated a rate of 150l/s/ha will be accepted providing it is proved to be a reduction on the existing discharge rate and stated that they typically require brownfield sites to use the existing connections to the Thames Water sewers. Should the existing connections be incompatible with the proposed drainage design then a further restriction to the allowable discharge rate may be sought by Thames Water.

10.3.42 Further consultation with Thames Water in 2015 has been carried out and they stated that the allowable discharge rate to their sewers will be restricted to the flows occurring during the 1:15 year event critical storm duration factoring in the capacity of the existing sewers and area already draining to the sewer.

10.3.43 Final agreement of the 2015 drainage strategy with Thames Water is on-going (August 2015).

10.3.44 Discussions were held with Adam Littler, senior drainage engineer, and Ray Mathews at the London Borough of Haringey Council offices on 18 August 2015. The council representatives stated that they do not want to receive a completely new Flood Risk Assessment, FRA, for the Southern Development as there is already a consented 2010 FRA for the Northumberland Development Project. The concepts used in the 2010 FRA are to be used for the FRA for the Project

Cumulative Development Drainage and Flood Risk
10.3.45 The area to the north of the Project Site and south of the Northumberland Park, the northern development, has recently been constructed. The northern development drainage system is separate from the Project Site drainage system. The runoff from the 1 in 100 year plus climate change event from the Project Site will be contained within the Project Site drainage system and will not affect the northern development site and vice versa. Hence there is not a cumulative effect on drainage and flood risk to either site.

10.3.46 Basement S73 permission has been granted to the Project. The construction of the basement carparks will not affect the runoff volume and discharge from the Project Site. The drainage flow paths will be directed away from the ramps entering the basement carparks.

10.3.47 The current planning applications and on-going developments in the vicinity of the Project have been
assessed and it is considered that the drainage and flood risk of the Project does not cause a cumulative effect on any other development as the Flood Risk Assessment has shown that the Project is not creating a flood risk elsewhere and the discharge rates from the Project will be less than the existing.

10.4 Inherent Design Mitigation

10.4.1 At the Project Site, contaminated land is being removed before construction commences.

10.5 Potential Environmental Impacts and Effects

Construction

i. Suspended Sediments

10.5.1 Potential sources of suspended sediments on demolition and construction sites include excavations, exposed ground and stockpiles, plant and wheel washing, dust and mud on site access roads and de-watering. Suspended sediments can reach surface water bodies through runoff during rainfall events or when areas are being washed down.

10.5.2 Increased suspended sediment affects both flora and fauna within surface water bodies and can have a long-lasting effect. Excessive levels of sediment can result in the suffocation of fish, smothering of plants, reduction in light levels and quality of surface water abstractions. Any organic matter contained within the sediment will increase the biological oxygen demand of the water and result in a lowering of dissolved oxygen. If the Project Site is contaminated, sediments may also contain toxic particles such as heavy metals, which may directly impact flora and fauna, and bio-accumulate in the food chain.

10.5.3 Good practice mitigation measures should be applied to ensure the impact during the construction phase on ecologically valuable features is negligible.

ii. Oils and Hydrocarbons

10.5.4 Oils and hydrocarbons can have a major adverse and long-term effect on the water quality of controlled waters. Oils bind to sediments, strata and organisms and can form emulsions that float on the water surface.

10.5.5 Sources of oils and hydrocarbons on demolition and construction sites include storage tanks, plant and machinery, spillage and leakage at refuelling areas and vandalism.

10.5.6 Without control measures, impacts associated with the accidental release of oil and fuel during construction works is considered to be a significant adverse effect.

iii. Concrete and Cement Products

10.5.7 Concrete and cement products are highly alkaline and their release into the environment can have a major adverse, albeit short-term, effect on flora and fauna, and on water quality in general. This could result in poor tasting potable water and an increase in pH, potentially to levels above the legal drinking water standard.

10.5.8 On-site concrete mixing and the washing down of mixing areas results in the production of large volumes
of contaminated wastewater, which can end up in the surface water drainage system.

10.5.9 Without control measures, the impacts associated with concrete and cement products are considered to be a significant adverse effect.

iv. Contaminated Land

10.5.10 At the Project Site, identified contaminated land is being removed before construction commences although it is possible that areas of contamination, associated with historic land usage, could exist within the Project footprint. There is therefore the potential for disturbance and mobilisation of contaminants into the surface water or groundwater. Refer to ES Chapter 11 “Ground Conditions and Hydrogeology” for information regarding contaminated land.

10.5.11 Without control measures, the impacts associated with mobilisation of contaminants is considered to be a significant adverse effect.

v. Groundwater

10.5.12 Potential pathways could result in adverse impacts on controlled waters from the disturbance of contaminated groundwater. Consideration will be given to the possibility of encountering shallow groundwater within the made ground strata within and around the perimeter of the Project Site during excavations for foundations or extension of basement levels. Refer to ES Chapter 11 “Ground Conditions and Hydrogeology” for information regarding groundwater.

10.5.13 Without control measures, the impacts associated with the contamination of groundwater are considered to be a significant adverse effect.

vi. Existing Drainage Network

10.5.14 Disturbance of the existing drainage network has the potential for pollutants within the sewerage system to be re-released in an uncontrolled manner, particularly during heavy rainfall when the system may be overloaded and when there is significant runoff. During redevelopment the surface water drainage, sewerage and wastewater from the Project Site may be connected to existing services. As such, it may contain suspended sediments, oils and hydrocarbons, sewage, alkaline water and any other potential contaminants that may have been used on site.

10.5.15 Without control measures potential impacts to the existing drainage network are considered to be a significant adverse effect.

vii. Preferential Pathways

10.5.16 There may be disused drainage piping on Project Site from earlier developments, which could provide a preferential pathway to surface waters via abandoned overflows.

10.5.17 Without control measures the potential impact associated with pollution to surface or groundwater via preferential pathways is considered to be a significant adverse effect.

viii. Physical Disturbance of Aquifers
10.5.18 There is one Environment Agency licensed ground water abstraction point within 1000m of the Project Site. It is anticipated that piling will be required as part of the redevelopment so control measures are required to ensure the confining impermeable clay layer to the chalk aquifer remains intact.

Operation

i. Contamination from In-Situ Materials

10.5.19 There is a possibility that foundation materials could be in contact with the perched ground water. There are basements for the residential blocks and hotel which will be used for parking. These basements will be waterproofed with WRc approved products to ensure no contamination of the perched ground water.

ii. Surface Water Run-off and Foul Drainage

10.5.20 The completed Project is not anticipated to involve a significant change in impermeable surface coverage of the Project Site.

10.5.21 It is anticipated that the water use of the completed project will be the same as the existing and hence it is not expected that there will be a need to abstract water from the aquifer below the Project Site. However, in the event that a need for abstraction does arise, a separate feasibility study will be carried out to confirm the availability and quality of groundwater beneath the Project Site, and to determine whether such abstraction is economically and environmentally viable or sustainable. This feasibility study would include consultation with the Environment Agency and other appropriate bodies to identify the impacts of such abstraction.

iii. Water Quality

10.5.22 Once completed, the Project’s surface water runoff will be collected into on-site sustainable urban drainage systems (SuDS). The on-site SuDS consist of underground storage tanks and over sized pipes to create attenuation volume so that the peak runoff can be stored on site and released at the agreed discharge rate. The runoff is then discharged into the Thames Water storm water sewerage network mainly utilising existing connection points in Northumberland Park, High Road, Worcester Avenue and Park Lane and into Moselle Brook at agreed discharge rates.

10.5.23 Storm water from the roof areas and from the paved areas will be collected separately.

10.5.24 Implementing attenuation into the surface water drainage design will allow for the slowing of drainage flows. One such SuDS device, underground storage, temporarily detains water to be discharged over time to help reduce the volume of water being conveyed at any one time downstream. The additional detention time will allow solid pollutants to settle out of the surface water drainage. These measures will aid in keeping sewer flows within their sewerage networks, help to reduce flash flooding and improve surface water runoff quality. The implementation of this SuDS device will result in a permanent minor beneficial impact on surface water quality.

iv. Flood Risk

10.5.25 AECOM Corporation has prepared a flood risk assessment as a separate document located in Appendix 10.1.
10.5.26 In accordance with PPG 2015, buildings used for assembly and leisure activities are classed as less vulnerable. There are also residential or dwelling houses planned for the Project, which are classed as more vulnerable. In accordance with PPG2015, more vulnerable and less vulnerable uses are appropriate in Flood Zones 1 and 2.

10.5.27 The Environment Agency has supplied TUFLow modelled flood levels for Moselle Brook adjacent to the Project Site for the extents of Flood Zone 2. AECOM has reviewed the data and the review confirms only the western edge of the Project Site is located in Flood Zone 2 and the remainder is located in Flood Zone 1. The residential and hotel development is not in Flood Zone 2 and all dwelling areas will be above the 1 in 100 plus climate change flood water level.

10.5.28 The Project’s surface water discharge rates relative to the worse case storm of 15 minute duration shall be restricted to meet the requirements of the Environment Agency and Thames Water, see section 10.3.40 to 44.

10.5.29 The Project covers 6.5 hectares and the area has been divided onto nine catchments depending on the type of runoff e.g. roof or paved area and position of drainage outlet. Each catchment has been considered entirely impermeable.

10.5.30 A 20% allowance has been made for climate change for the stadium and 30% allowance for the residential and hotel development.

10.5.31 Surface water runoff from the catchments has been modelled using WinDes drainage software to determine the maximum storage requirements to obtain the required discharge rates and to ensure that the 1:100 year storm event plus climate change is contained in the Project.

10.5.32 Exceedance paths for extreme events or a failure of the drainage system will direct runoff to the stadium hence reducing the flood risk outside the Project.

10.5.33 The project is considered to be at a negligible risk of fluvial flooding from the culverted Moselle Brook and at negligible risk of flooding from sewer flooding from the Thames Water sewerage network, groundwater, overland flow and a breach of a reservoir.

10.5.34 As stated section 10.5.31, the drainage system has been designed not to flood for the 1:100 year event plus the recommended allowance for climate change. Consequently the effects of climate change on flooding will not materially affect the flood risk for the Project Site up to the 1:100 year event.

10.5.35 As the discharges into the Moselle Brook and the drainage system will not be increased and the Project does not obstruct a flow path, the flood risk to the areas upstream and downstream of the Project will not be increased.

v. Sustainable Drainage Systems

10.5.36 The CIRIA SuDs Manual describes the SuDs Management train, prevention, source control, site control and regional control to reduce flow rates and volumes. Due to the urban environment and confined space, creating a SuDS train was not considered practical.

10.5.37 Attenuation will be created by underground geocellular storage tanks and oversized pipes. The majority of
runoff from the Project will discharge into an attenuation tank before being discharged into the receiving water body at the agreed discharge rates. In the Project, runoff from the roofs will be stored separate from the runoff from the paved areas. All runoff from the paved areas will discharge via an appropriate trap before entering the drainage system. The paved areas should be regularly cleaned/swept to reduce the build-up of pollution.

10.5.38 On site attenuation has produced a 85% betterment in the 1 in 100 year storm event discharge rate compared with the Brown field runoff rate.

10.5.39 Green roofs are used for a Hotel and Residential development areas.

vi. Conventional Drainage Scheme

10.5.40 The conventional surface water drainage scheme is designed to remove runoff from the impervious surfaces by collecting flows in pipes, channels and gullies. The main objective is to minimise the flood risk to the Project Site buildings and paved areas while minimising the impact of the water quality of the runoff. See section 10.5.37.

10.5.41 The surface water runoff from 5.7 hectares will be pumped from the underground storage to the receiving water body. The runoff from the remaining 0.6 hectares will discharge to the receiving water bodies by gravity.

vii. Storage / Attenuation of Surface Water Runoff

10.5.42 Hydraulic models of the proposed drainage systems were developed by Buro Happold using underground storage to determine on-site attenuation. The attenuation volume for each drainage catchment area is listed in Table 10.1

<table>
<thead>
<tr>
<th>Area</th>
<th>Area (Ha)</th>
<th>Outfall</th>
<th>Receiving Water Body</th>
<th>Attenuation volume (m3)</th>
<th>Design outfall rate (l/s)</th>
<th>P – pumped</th>
<th>G – gravity</th>
<th>Brown Field discharge rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.419</td>
<td>2</td>
<td>Moselle Brook</td>
<td>30</td>
<td>160</td>
<td>G</td>
<td>P</td>
<td>151</td>
</tr>
<tr>
<td>A1</td>
<td>2.668</td>
<td></td>
<td></td>
<td>1352</td>
<td>70</td>
<td>P</td>
<td>G</td>
<td>961</td>
</tr>
<tr>
<td>B</td>
<td>0.107</td>
<td>3</td>
<td></td>
<td>20</td>
<td>5</td>
<td>G</td>
<td>P</td>
<td>39</td>
</tr>
<tr>
<td>C</td>
<td>0.084</td>
<td>7</td>
<td></td>
<td>21</td>
<td>5</td>
<td>G</td>
<td>P</td>
<td>30</td>
</tr>
<tr>
<td>D</td>
<td>0.192</td>
<td>9</td>
<td>TW sewer – Park Lane</td>
<td>45</td>
<td>35</td>
<td>P</td>
<td>G</td>
<td>69</td>
</tr>
<tr>
<td>E</td>
<td>0.614</td>
<td>6</td>
<td></td>
<td>230</td>
<td>35</td>
<td>P</td>
<td>G</td>
<td>221</td>
</tr>
<tr>
<td>F</td>
<td>1.876</td>
<td>4</td>
<td>TW sewer – Worcester Avenue</td>
<td>827</td>
<td>30</td>
<td>P</td>
<td>P</td>
<td>676</td>
</tr>
<tr>
<td>G</td>
<td>0.19</td>
<td>5</td>
<td></td>
<td>13</td>
<td></td>
<td>P</td>
<td>G</td>
<td>68</td>
</tr>
<tr>
<td>H</td>
<td>0.32</td>
<td>8</td>
<td>TW sewer – Northumberland Park</td>
<td>160</td>
<td>5</td>
<td>P</td>
<td>G</td>
<td>115</td>
</tr>
<tr>
<td>Total</td>
<td>6.47</td>
<td></td>
<td></td>
<td>160</td>
<td>358</td>
<td></td>
<td></td>
<td>2330</td>
</tr>
</tbody>
</table>

10.5.43 Buro Happold design is shown on drawing BHC-XX-9403 in Appendix D of the revised FRA. The revised FRA is in Appendix 10.1.
10.5.44 The Project Site is at negligible risk of fluvial flooding from the culverted Moselle Brook and at negligible risk of flooding from sewer flooding from the Thames Water sewerage network, groundwater and overland flow both now and after construction of the project. The effects of climate change on flooding have also been considered and found not to materially affect the flood risk for the Project Site.

10.6 Additional Mitigation, Compensation and Enhancement Measures

Construction

10.6.1 Mitigation measures should include:

- Settling ponds to ensure the silt content of the runoff is low before it is pumped into the tidal;
- Any runoff should pass through a separator to ensure hydrocarbons are removed;
- Drip trays should be used under all construction equipment;
- Fuel on site should be stored in a bunded fuel storage area;
- Bio oils should be used in the construction equipment where appropriate;
- If the aquifer is exposed then an impermeable layer will be placed over the exposed chalk before construction;
- The soil contaminated by a spillage should be removed and disposed to land fill;
- The correct strength of pipe should be used for the drainage system for the size of vehicles being stored; and
- The contractor should follow an Environmental Action Plan specifically for the Project Site.

1. Preferential pathways and disturbance to groundwater

10.6.2 In order to reduce the movement of contamination via these pathways, a number of mitigation measures in line with best practice (listed under the ‘Legislation and Policy Context’ section of this chapter) should be undertaken, which are:

- The use of geotextile bunding to isolate and minimise the ingress of surface water run-off to non-decommissioned boreholes or exposed surface water drainage pipes;
- Decommissioning of boreholes to the satisfaction of the Environment Agency;
- If perched groundwater is encountered during establishment of the core foundations dewatering may be required. The most appropriate methods to dewater excavations should be selected, for example, prior to dewatering, the perimeter of the excavation could be enclosed with either sheet-pile or a diaphragm wall. Piezometers (standpipes) could then be placed outside the sheet pile wall to monitor groundwater levels; and
- Water arising from excavations will need to be disposed of to the Moselle Brook or the Thames water sewer system (subject to agreement with the EA and TWUL), if uncontaminated and following the removal of silt via settlement ponds or alternative measures.

10.6.3 The adoption of these mitigation measures will reduce the magnitude of effect and so the residual effect from preferential pathways is assessed as of “minor-neutral” significance in relation to the Secondary and Principal Aquifer.
ii. Disturbance of existing drainage system

10.6.4 A number of mitigation measures in line with best practice (listed under the ‘Legislation and Policy Context’ section of this chapter) will be implemented at the Project:

- All existing utilities should be identified and marked prior to works commencing;
- Signs should be used to warn of the presence of utility infrastructure;
- Any damage to the drainage network should be immediately repaired; and
- An emergency response plan should be produced to ensure spillages and leakages are immediately contained.

10.6.5 The mitigation measures described above are intended to reduce the magnitude of effect and likelihood of damage occurring to water supply infrastructure, mobilisation of pollutants and to restrict their passage to controlled waters. This will reduce the likely residual effects to that of “minor-neutral” significance.

iii. Disturbance of contaminated land

10.6.6 Regular monitoring should be undertaken during the construction period to enable identification for any potential contamination. In the event that contamination is discovered, work should stop immediately and measures taken to prevent disturbance and mobilisation of contaminants, until the contamination has been treated in-situ or removed off-site disposal or treatment.

10.6.7 Therefore, with the appropriate methodology and control measures in place (mitigation measures), the potential magnitude of effect associated with the presence of undiscovered areas of contamination on-site will be reduced to negligible and the residual effect is therefore considered to be of “minor-neutral” significance.

iv. Leaks and Spillages

10.6.8 Measures should be taken in line with best practice (listed under the ‘Legislation and Policy Context’ section of this chapter) to protect controlled waters from the release of oils and hydrocarbons at the Project Site. These measures comprise:

- Oils and hydrocarbons should be stored in designated locations with specific measures to prevent leakage and release of their contents, including the siting of storage areas away from surface water drains and on an impermeable base with an impermeable bund that has no outflow and is of adequate capacity to contain 110% of the contents. Valves and trigger guns will be protected from vandalism and kept locked when not in use;
- Wherever possible, plant and machinery should be kept away from the drainage system and should have drip trays beneath oil tanks/ engines/ gearboxes/ hydraulics which should be checked and emptied regularly via a licensed waste disposal operator;
- Following the discharge of surface run-off and de-watering effluents to settling tanks the drainage would be routed to oil separators prior to discharge to sewer; and
- An emergency spillage action plan should be produced, which site staff will have read and understood. On-site provisions should be made to contain a serious spill or leak through the use of
10.6.9 Implementation of the above mitigation measures will reduce the magnitude of the potential impact (and minimise the risk occurring in the first instance) to the environment and thus result in a residual effect of “minor-neutral” significance.

v. Suspended sediments

10.6.10 A number of mitigation measures in line with best practice (listed under the 'Legislation and Policy Context' section of this chapter) should be employed at the Project Site to prevent the release of suspended sediments and reduce the effect to negligible. These comprise:

- Cut-off ditches and / or geotextile silt-fences which should be installed around excavations or exposed ground and stockpiles to prevent the uncontrolled release of sediments from the Project Site;
- The Project Site access points which should be regularly cleaned to prevent build-up of dust and mud;
- Earth movement should be controlled to reduce the risk of construction silt combining with the Project Site run-off;
- Properly contained wheel wash facilities should be used where required, to isolate sediment rich run-off; and
- Drainage of surface run-off and de-watering effluents to settling tanks to remove suspended solids prior to discharge the Moselle Brook or the Thames Water sewer system or removal via a licensed waste operator.

10.6.11 Adoption of these mitigation measures will minimise the magnitude and the likelihood of uncontrolled release of sediment, therefore resulting in a residual impact of negligible magnitude and therefore an effect of “minor-neutral” significance on the Secondary Aquifer (shallow groundwater) and surface water receptors.

vi. Concrete Product and cement products

10.6.12 A number of precautions in line with best practice (listed under the 'Legislation and Policy Context' section of this chapter) will be taken on-site to reduce the potential magnitude of an effect. These comprise:

- The majority of concrete used will be pre-mixed and delivered from an off-site source, thereby negating the need to mix concrete on-site and reducing the creation of alkaline wastewater;
- Wherever possible, any mixing and handling of wet concrete on-site will be undertaken in designated impermeable areas, away from any drainage channels or surface water;
- A designated impermeable area will be used for any washing down or equipment cleaning associated with concrete or cementing processes and wastewater will be contained and removed by tanker to a suitable discharge location via a licensed waste operator; and
- Pre-cast units will be used in construction where feasible.
10.6.13 These control (mitigation) measures will reduce the volume of potentially contaminated wastewater being produced and therefore the residual potential effect to both surface water, groundwater and the drainage network will be of “minor-neutral” significance. The effect on the Secondary and Principle Aquifer and surface water receptors will therefore be of “minor-neutral” significance.

vii. Surface Runoff

10.6.14 Runoff from Project Site during construction should be controlled for rate and for quality issues, such as suspended sediments. Appropriate control measures, such as settlement ponds and bunds around the Project site, should be utilised during construction in order to temporarily store runoff prior to discharge. Surface water runoff will be discharged into the Moselle Brook or Thames Water sewer system at agreed rates. There is no residual impact as a result of the Project.

viii. Flood risk

10.6.15 The underground storage/attenuation tanks will be within an impermeable membrane to ensure the runoff from the Project Site is separate from the ground water hence the impact on the perched water table will be negligible.

10.6.16 The discharge rates into the Moselle Brook and Thames Water Sewers will be regulated during the construction phase to an agreed rate ensuring no increase in flood risk during the construction stage.

Operation

10.6.17 Mitigation measures should include:

- Hydrocarbons should be removed from any runoff before entering the receiving water body;
- Fuel on the Project Site should be stored in a double bunded storage area;
- The soil contaminated by a spillage should be removed and disposed to land fill;
- The drainage system, including the pumping system, and SuDS should be inspected and maintained on a regular basis to ensure integrity of the system; and
- Back up pumping facilities should be available.

i. Leaks, spillages, application of fertilisers and pesticides

10.6.18 An emergency spillage response plan would be put in place and education/information on waste treatment/emergency events/spills etc. should be provided to THFC staff on the Project Site.

10.6.19 The risk of spillages of fuels and oils occurring should be partially managed through mitigation by design, such as speed limits, road markings and procedures during delivery or movement of materials.

10.6.20 The use of a management plan to regulate the frequency, type and volume of application of fertilisers, pesticides and herbicides on landscaped areas/green roofs should also ensure that the optimum type and volumes are applied so as not to have an adverse impact on underlying groundwater or runoff into the drainage system.

10.6.21 All pumps should be regularly maintained to reduce the risk of oil leaks.
10.6.22 Implementation of the above measures ensures that the potential impact on all receptors, including the Secondary and Principal Aquifer, and surface water receptors is reduced to “minor-neutral” significance.

ii. Contamination from in-situ materials

10.6.23 Where the Project involves the construction of foundations, damp-proof membranes should be incorporated. Such construction should therefore lie within the damp-proof membranes and will not be exposed to underground strata or groundwater. Therefore the residual impact on groundwater quality post-mitigation is likely to be negligible.

10.6.24 It is envisaged that all the proposed drainage/service runs will be surrounded by appropriate granular bedding materials and located above the static level of any shallow groundwater. Some confirmatory tests of the new drainage systems will be carried out in accordance with statutory requirements. The drainage network installed as part of the Project will be constructed to meet with Building Regulations Part H. As a consequence, the impact of any permanent horizontal pathways on water flows and on groundwater quality is considered to be of “minor-neutral” significance.

iii. Flood Risk

10.6.25 The discharge from the Project Site will be attenuated by storage tanks to agreed discharge rates. The impact on increase flood risk to areas downstream of the Project Site will be negligible.

10.6.26 The Project Site is designed to contain the runoff from the 100 year event plus climate change flood in the underground storage tanks and oversized pipes, in excess of the agreed discharge rates.

10.6.27 The Project Site is designed so that in the case of an extreme weather event or drainage system failure, runoff will be directed to the stadium.

10.7 Assessment Summary and Residual Environmental Impacts and Effects

Residual Effects

10.7.1 No significant impacts to water resources are expected throughout the construction works or the operational stage of the Project provided that the mitigation measures, as discussed, are applied. Should this be the case, no residual effects would occur as a result of the Project.

Construction

10.7.2 A summary and Residual Environmental Impacts and Effects are given in Table 10.4

Operation

10.7.3 A summary and Residual Environmental Impacts and Effects are given in Table 10.5.
### Table 10.2: Summary of Surface Water Resources Receptors

<table>
<thead>
<tr>
<th>Water feature</th>
<th>Location description</th>
<th>Watercourse classification</th>
<th>WFD water body and current status</th>
<th>WFD 2027 status objective (identified in RBMP)</th>
<th>Designations</th>
<th>Receptor value / sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moselle Brook</td>
<td>Culverted watercourse under High Road along western side of Project Site.</td>
<td>Main River</td>
<td>Moderate (ecological), Heavily Modified Water Body</td>
<td>Good (ecological) (potential)</td>
<td>Main River</td>
<td>Current – Low</td>
</tr>
</tbody>
</table>

### Table 10.3: Summary of Groundwater Resources Receptor

<table>
<thead>
<tr>
<th>Geology</th>
<th>Location description</th>
<th>Description</th>
<th>Aquifer Classification</th>
<th>WFD current status</th>
<th>WFD 2027 status objective</th>
<th>Designations</th>
<th>Receptor value / sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial Deposits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alluvium</td>
<td>Underlying entire Project Site.</td>
<td>Clay silts and sand</td>
<td>Secondary</td>
<td>Not assessed</td>
<td>N/A</td>
<td>None</td>
<td>Low</td>
</tr>
<tr>
<td>Bedrock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London clay over CHALK</td>
<td>Underlying entire Project Site.</td>
<td>Permeable chalk</td>
<td>Principal</td>
<td>Poor</td>
<td>Poor (chemical)</td>
<td>The Project Site is partly in the outer zone of an Environment Agency groundwater vulnerability zone, as defined by the Environment Agency web site.</td>
<td>High</td>
</tr>
</tbody>
</table>

### Table 10.4: Surface Water Drainage and Flood Risk Construction Residual Effects

<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance</th>
<th>Additional Mitigation</th>
<th>Residual impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspended Sediment</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>Controlled surface water releases; Clean site; Settlement tanks;</td>
<td>Very Low</td>
<td>Minor-neutral</td>
</tr>
<tr>
<td>into Moselle Brook</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and shallow aquifer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil and hydrocarbons</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>Store hydrocarbons in bunded tank in designated area; Valves protected against vandalism; Drip trays for plant; Emergency Spillage</td>
<td>Very Low</td>
<td>Minor-neutral</td>
</tr>
<tr>
<td>into Moselle Brook</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and shallow aquifer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Concrete and cement products in to Moselle Brook and shallow aquifer

<table>
<thead>
<tr>
<th>Impact</th>
<th>Low</th>
<th>Moderate</th>
<th>Very Low</th>
<th>Minor-neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contaminated Land affecting Moselle Brook and shallow aquifer</td>
<td>Pre-mix and delivered from off-site source; Designated impermeable areas; Water for washing down will be tankered to licensed waste operator; Use of precast concrete units.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact</th>
<th>Low</th>
<th>Moderate</th>
<th>Very Low</th>
<th>Minor-neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Disturbance to chalk aquifer</td>
<td>Monitoring to ensure confining impermeable clay layer, approx. 10m thick, to the chalk aquifer remains intact.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact</th>
<th>Low</th>
<th>Moderate</th>
<th>Very Low</th>
<th>Minor-neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferential pathways to surface water drainage system and shallow aquifer</td>
<td>Decommissioning of Boreholes to satisfaction of EA; Dewatering of excavations to approved repository; All existing utilities will be identified and marked prior to work commencing; any damage to the drainage network will be immediately repaired.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact</th>
<th>Low</th>
<th>Moderate</th>
<th>Very Low</th>
<th>Minor-neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Risk to surrounding area</td>
<td>The discharge rates into Moselle Brook and Thames Water Sewers will be regulated to an agreed rate ensuring no increase in flood risk.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
<td></td>
</tr>
</tbody>
</table>
Table 10.5: Surface Water Drainage and Flood Risk – Operational Residual Effects

<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Sensitivity of Receiver</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance</th>
<th>Additional Mitigation</th>
<th>Residual Impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaks, spillage, application of fertilisers and pesticides – risk of contaminating surface water</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>Emergency spill response; Vehicle speed limits; Management plan for use of fertilisers etc. Hydrocarbons and silt removed from runoff before entering the receiving water body.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
</tr>
<tr>
<td>Contamination for insitu materials.</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>Building above damp-proof course hence isolated from underground strata and groundwater; New drainage will be constructed to meet Building Regulations Part H.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
</tr>
<tr>
<td>Flood risk to surrounding area.</td>
<td>High</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>The Project does not increase the impermeable area; The discharge from the Project will be attenuated by storage tanks and discharged at agreed rates; Design is for the 1:100 year plus climate change event to be stored in the underground storage tanks and oversized pipes in excess of the agreed discharge rates. The drainage system will be regularly maintained and back up pumps will be available.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
</tr>
<tr>
<td>Flood risk to the Project Site.</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td></td>
<td>Very Low</td>
<td>Minor-neutral</td>
</tr>
</tbody>
</table>
11. Ground Conditions and Hydrogeology

11.1 Introduction

11.1.1 This chapter of the ES has been produced by Buro Happold and addresses the potential effects the Project may have on the ground conditions of the Project Site and surrounding area. The assessment describes the potential and known sources of contamination within and around the Project Site, current conditions, those aspects of the Project that could affect, or be affected by soil and water contamination or the physical ground conditions, associated potential impacts, mitigation measures and residual impacts following mitigation.

11.2 Assessment Criteria and Methodology

11.2.1 The methodology for impact prediction is based on assessing both the magnitude of the changes expected and the sensitivity of the receptors. Criteria for assessing the significance of potential human and environmental impacts are based upon:

(i) a qualitative assessment of the magnitude of the impact (or how far the impact deviates from the baseline condition); and
(ii) the receptor sensitivity.

11.2.2 The resources/receptors and the main potential effects considered in this assessment are outlined in Table 11.1.

<table>
<thead>
<tr>
<th>Table 11.1: Receptors and Potential Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptor</td>
</tr>
<tr>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Construction Workers</td>
</tr>
<tr>
<td>Future Site Users (residents/workers/visitors)</td>
</tr>
<tr>
<td>Surrounding Users (neighbours)</td>
</tr>
<tr>
<td>Controlled Waters (groundwater)</td>
</tr>
<tr>
<td>Ecology</td>
</tr>
<tr>
<td>Built Environment</td>
</tr>
</tbody>
</table>
11.2.3 Receptors are considered to have varying degrees of sensitivity to contamination potentially present beneath the site, based on the potential scale of exposure and the integrity of any site specific exposure pathways. The scale of receptor sensitivity is defined in Table 11.2.

**Table 11.2: Criteria for determining receptor sensitivity**

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Very High to High** | People (on site or on neighbouring properties) occupying land in residential use with gardens, or using allotments, children’s play areas etc.  
Construction workers engaged in extensive earthworks  
Principal aquifer of regional importance used for potable water supply. Highly ecologically sensitive watercourse or water bodies  
Nationally or internationally designated ecological sites  
Buildings of high historic or local importance |
| **Medium** | People (on site or on neighbouring properties) occupying land in residential use without gardens, or using public areas of soft landscaping / open spaces  
Construction workers engaged in moderate earthworks  
Secondary aquifer, local watercourse or non-designated water bodies not used for large scale human consumption which can be used for industrial purposes; may be important for local recreational purposes  
Locally designated ecological sites  
Buildings, including services and foundations |
| **Low** | People (on site or on neighbouring properties) occupying or using commercial or industrial buildings, car parking, hard landscaping  
Construction workers site but with minimal disturbance to the ground  
Non-potable water resources, water body of low recreational qualities  
Sites of low ecological value and flora and fauna occupying non-designated open areas  
Infrastructure (e.g. roads, highways and railways) |
| **Very Low** | Land with no access to people and no neighbouring properties  
Construction workers on site, but with no disturbance to the ground on site  
Non-aquifer, no nearby watercourses or water bodies within 1km  
No sites of significant ecological value and no built development within 1km |

11.2.4 The criteria used to assess the magnitude is based on a qualitative assessment of the potential seriousness of the effect or how far the effect deviates from the baseline condition and the period of time that the effect could last, as shown in Table 11.3.

**Table 11.3: Criteria for determining magnitude of potential effects**

<table>
<thead>
<tr>
<th>Magnitude</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Substantial** | Short term (acute) or long term (chronic) adverse effects on human health, broadly equivalent to “significant harm” as defined by the Environmental Protection Act 1990  
Persistent and extensive pollution of water resource or ecosystem equivalent to Category 1 pollution incident (major pollution release)  
Catastrophic damage to crops / building / infrastructure |
| **Moderate** | Short term (acute) or long term (chronic) adverse effects on human health but not equivalent to “significant harm” as defined by the Environmental Protection Act 1990  
Non-persistent pollution of water resource or ecosystem equivalent to Category 2 pollution incident (moderate pollution release)  
Significant damage to crops / buildings / infrastructure (on or off site) |
Contamination of off-site soils

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor</td>
<td>Easily preventable, non-permanent health effects on humans</td>
</tr>
<tr>
<td></td>
<td>Minor, low-level, localised, temporary pollution of water resources or ecosystem</td>
</tr>
<tr>
<td></td>
<td>Easily repairable damage to crops / buildings / infrastructure</td>
</tr>
<tr>
<td></td>
<td>Easily preventable, permanent health effects on humans</td>
</tr>
<tr>
<td></td>
<td>Localised damage to buildings / infrastructure (on or off site)</td>
</tr>
<tr>
<td>Neutral</td>
<td>No discernible negative or positive effects</td>
</tr>
</tbody>
</table>

11.2.5 The combination of the sensitivity of the receptor and the magnitude of the impact provides an indication of the level of contamination on the Project Site, and the nature of the severity of possible effects. It should be noted that both rankings may vary in accordance with the different scenarios being considered (i.e. baseline, construction and operation). Positive or negative effects during construction and when the site is operational will be identified. The positive effects are associated with the mitigation of risks associated with contamination. The negative effects are temporary during the construction phase and relate to the increased potential for contaminant exposure (e.g. from the generation of contaminated dusts) and long term from the use of the site during the operational phase (and any residual contamination if remediation was inadequate or not carried out).

11.2.6 The assessment of potential and residual impacts will therefore use the scale of significance set out below. Effects can also be described as:

- Adverse or beneficial
- Direct or indirect
- Temporary or permanent
- Reversible or irreversible
- Cumulative

Table 11.4: Matrix for Determining Significance of Effects

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Receptor Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VH</td>
</tr>
<tr>
<td>Adverse</td>
<td></td>
</tr>
<tr>
<td>Beneficial</td>
<td>VH Substantial</td>
</tr>
<tr>
<td></td>
<td>H Substantial</td>
</tr>
<tr>
<td></td>
<td>M Major</td>
</tr>
<tr>
<td></td>
<td>L Moderate</td>
</tr>
<tr>
<td></td>
<td>VL Moderate</td>
</tr>
<tr>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Impact Magnitude</td>
<td>VL Moderate</td>
</tr>
<tr>
<td></td>
<td>L Moderate</td>
</tr>
<tr>
<td></td>
<td>M Major</td>
</tr>
<tr>
<td></td>
<td>H Substantial</td>
</tr>
<tr>
<td></td>
<td>VH Substantial</td>
</tr>
</tbody>
</table>
Methodology

11.2.7 A source-pathway-receptor analysis of the site (in accordance with good practice documents) will be undertaken. The Conceptual Site Model considers its environmental features, alongside the expected interaction of potential contamination sources with the environment. These terms are defined below:

- **Sources**: Potential or known sources of contamination associated with historic or recent/current land uses (e.g. Victorian factories, brewery use, fuel storage, spills, leaks);
- **Pathways**: mechanisms / systems through which exposure of a receptor to a contaminant could occur e.g. direct contact with contaminated soils, migration through air, over land or via permeable ground; and
- **Receptors**: of varying sensitivity that could be adversely affected by contact (direct or indirect) with a contaminant. e.g. people living, working or visiting the site, groundwater and surface water bodies, ecological resources (flora and fauna).

11.2.8 Where a source and receptor are linked by an exposure pathway, a 'pollutant linkage' is present, whereby there is a circumstance through which some level of environmental harm could occur which has to be assessed and mitigation identified as appropriate.

Cumulative

11.2.9 Cumulative impacts from other developments have been considered and discounted as other developments are too distant from the site to have an impact on the sites ground conditions and hydrology.

Previous Assessment

11.2.10 A previous assessment had been undertaken in May 2010.

Scoping Opinion

11.2.11 Although a formal Scoping Opinion was not sought the Scope of the EIA was based on the technical scope for the original 2010 ES and the Southern Addendum. A draft Scoping Report was sent to the Council on the 19th June 2015, for their informal comments and discussion. No informal comments were received in relation to the Ground Conditions and Hydrology assessment.

Consultation

11.2.12 Consultation with the Local Authority officer responsible for ground contamination has been undertaken to ensure agreement with the proposed remedial and works approach.

Planning Policy and Guidance

11.2.13 Land contamination is regulated under several regimes, including environmental protection, pollution prevention and control, waste management, planning and development control and health and safety legislation. The primary regulatory regimes under which contaminated land are managed in the UK are: the planning process described in the National Planning Policy Framework (DCLG, 2012) and Part 2A of the Environmental Protection Act (DEFRA, 1990).

11.2.14 The framework for the assessment of potential land contamination adopted in this assessment will be based on current guidance documents regarding the implementation of these regimes and the assessment of potentially contaminated land, with particular reference to: the Environment Agency Model.

11.2.15 Reference will also be made to regional planning policy, namely the London Plan and Spatial development strategy for Greater London, July 2011 (Greater London Authority, 2013). The London Borough of Haringey Core Strategy was reviewed, however, no comment on contaminated land was included within the document.

Baseline Data Collection

Geographical Scope

11.2.16 This Chapter covers the red line area as defined in Appendix 1.1.

Assumptions and Limitations

11.2.17 None

11.3 Baseline Conditions

11.3.1 This section provides a description of the current baseline environmental conditions of the site with respect to contamination. The area covered within the report includes the land within the site boundary, and any surrounding land which could impact the Project or be susceptible to impact as a result of development.

Site History

11.3.2 With reference to historical maps, the site was occupied by residential dwellings, orchards and open space since at least 1867 until 1896 when the orchards had been cleared, and buildings constructed along Tottenham High Road. Following construction of the football stadium in 1899, other parts of the site have been occupied by various commercial/industrial land uses including, but not limited to, engineering works, a brewery, industrial units, a machinery manufactory, bottling stores, paper works, a shoe factory, garages, a piano works, milk depot, warehouses, electrical substations, and a surgery until reaching its existing condition in 1999.

11.3.3 Numerous commercial/industrial uses have surrounded the site for varying periods since at least 1881 including a gas works (approximately 1km northeast), Great Eastern Railway lines, and various engineering and industrial works. A more detailed description of the site history is given in Section 3.2 of the Buro Happold Desk Study Report (Appendix 11.1).

Geology and Hydrology

11.3.4 According to the geological maps for the area the sequence of strata beneath the site consists of the Kempton Park Gravel Formation underlain by London Clay, the Lambeth Group (formerly Woolwich and Reading Beds) and Thanet Sands. The Thanet Sands are underlain at a depth of about 60m below ground level (bgl) by the Upper Chalk.

11.3.5 The southeast corner of the site is recorded to be underlain by the Enfield Silt Formation (brickearth) which overlies the Kempton Park Gravels. The groundwater table is likely to sit within the Kempton Park Gravels forming an un-confined aquifer, designated by the Environment Agency as a Minor Aquifer. A
deeper aquifer is also likely to be present within the deposits of the Lambeth Group and Thanet Sand Formation, confined by the overlying London Clay.

11.3.6 The Lambeth Group and the Thanet Sand Formation are also classified by the Environment Agency as Minor Aquifers. Groundwater located within the underlying Chalk is designated as a Major Aquifer that is of very high importance to the regional water supply. The nearest recorded groundwater abstraction is located 285m north-east of the site at 881 Tottenham High Road. The abstraction license is owned by Cannon Automotive Ltd, with groundwater utilised for general cooling purposes. The nearest recorded groundwater abstraction licence for potable supply is located 898m east of the site. The license is owned by Thames Water Utilities Limited. The aquifer that both these abstraction licenses penetrate is unknown but is likely to be the Chalk. The majority of the site, excluding the northwest corner, is located within a Groundwater Source Protection Zone (SPZ) II (Outer Protection Zone).

Hydrology

11.3.7 The nearest surface water feature is the River Moselle. The river is located approximately 360m to the west of the site before it enters a culvert and runs below ground along the western edge of Tottenham High Road, adjacent to the western boundary of the site. At Scotland Green the river bends eastwards towards Tottenham Marshes. The western boundary of the site lies within a Zone 2 fluvial floodplain.

Ground Investigations

11.3.8 Table 11.5 provides a summary of all of the ground investigations that have been carried out at the Project Site. The reports from historical investigations (Soil Mechanics and Soiltechnics) have been reviewed in detail and the results presented in Section 6 of the Buro Happold Desk Study Report (Appendix 11.1). The main findings of these investigations have been summarised in the following sections. The Soiltechnics investigation was limited to the central portion of the site and assessed potential contamination of soil, groundwater and ground gas. The Geotechnics/Buro Happold investigation assessed potential contamination within the northern and central portion of the site.

**Table 11.5: Summary of ground investigations on/or adjacent to the Project Site**

<table>
<thead>
<tr>
<th>Company/Date</th>
<th>Report</th>
<th>Investigation Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan-93</td>
<td>Soil Mechanics</td>
<td>Site Investigation for North Stand Roof Towers, Tottenham</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two Boreholes (up to 30m bgl) Two trial pits (up to 2.6 bgl) Standpipe piezometers installed in both boreholes</td>
</tr>
<tr>
<td>Dec-93</td>
<td>Soil Mechanics</td>
<td>Site Investigation for Tottenham Hotspur Football Club South Stand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Three boreholes (up to 30m bgl) Three trials pits (up to 3.4m bgl) Standpipe and pneumatic piezometers installed in two boreholes</td>
</tr>
<tr>
<td>Oct-05</td>
<td>Soiltechnics</td>
<td>Proposed Residential Redevelopment on land off Pacton Road, Tottenham - Ground Investigation Report and Report on the Classification of waste soils for off site disposal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eight boreholes (up to 25 bgl) Three window samples (up to 4m bgl) Three trial pits (up to 3.6 bgl) Gas monitoring standpipes installed in 8 window samples Groundwater monitoring standpipes</td>
</tr>
</tbody>
</table>
Ground Conditions

11.3.9 The ground investigations detailed in Table 11.5 have shown that the geological sequence beneath the Project Site is generally as predicted from published geological data and previous ground investigations. This sequence comprises Made Ground overlying Kempton Park Gravel, London Clay, Lambeth Group and Thanet Sands. Chalk was not encountered; however gravels of flint were recorded at the base of BH09-09A (43.8m bgl) which may indicate the top of the Chalk. Table 11.6 provides a summary of the geology beneath the site.

Table 11.6: Summary of Geology and Hydrology

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Thickness</th>
<th>Aquifer Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Made Ground</td>
<td>Brown/grey sand and gravel with brick and cobble overlying soft brown grey slightly sandy gravelly clay containing brick, cobles, porcelain, ceramics, plastic, clinker, concrete, coal, ash pockets and flint</td>
<td>0.7-2.8m (ave 2.3m)</td>
<td>Unclassified</td>
</tr>
<tr>
<td>Gravely Clay*</td>
<td>Stiff reddish brown slightly sandy slightly gravelly clay. Laterally discontinuous</td>
<td>0.35-1.7m (ave 0.8m)</td>
<td></td>
</tr>
<tr>
<td>Kempton Park Gravels</td>
<td>Dense brown sandy gravel of quartz and flint</td>
<td>2.1 - 3.5m (ave 2.6m)</td>
<td>Minor Aquifer</td>
</tr>
<tr>
<td>London Clay</td>
<td>Stiff fissured grey slightly gravelly clay containing lenses of slightly sandy gravel. Rare shell remains at depth</td>
<td>14.2-16.1m (ave)</td>
<td>Non Aquifer</td>
</tr>
</tbody>
</table>
11.3.10 Firm to stiff silty clay (Enfield Silt) was recorded beneath the Made Ground, and interbedded with Kempton Park Gravels in the south-eastern portion of the site by Soil Mechanics. From observations made in the field and monitoring data, it appears that in some locations groundwater is perched within the Made Ground with the main groundwater body located within the Kempton Park Gravel. Monitoring data suggests that groundwater with the Kempton Park Gravel is flowing in a southerly direction. As part of the Phase 1 Ground Investigation for the site long-term groundwater monitoring has been carried out within the area of the new pitch for the proposed stadium development. This monitoring is intended to determine how quickly the water levels change in response to weather conditions, and to determine maximum water levels for consideration in setting the final pitch level and design of the pitch build-up. Water level data loggers were installed in October 2009 within three boreholes (BH09-07, BH09-11 and BH09-12) within the proposed pitch area. Groundwater levels appear to fluctuate consistently over time within each borehole, ranging between approximately 8.8m AOD and 9.8m AOD within the Kempton Park Gravel.

11.3.11 Underground petroleum storage tanks were noted beneath the former petrol station (central portion of site along Tottenham High Road), however their location and size was unknown. It was reported that these tanks and their fuel lines had been foam filled during the station decommissioning. The petroleum section of the London Fire and Emergency Planning Authority does not hold records on whether these tanks were foam filled. However the Authority does hold plans from September 2006 showing the location of five proposed 35,000L tanks, with indication that previous tanks were to be excavated and removed.

**Soil Contamination**

11.3.12 A moderate hydrocarbon odour and oil sheen was observed on the surface of groundwater purged from BH09-12 during sampling. No distinguishable odour, visible sheen or evidence of LNAPL/DNAPL was observed on water purged from any of the other boreholes. Leachate results show metals in Made Ground are reasonably leachable. Some exceedances of screening criteria were recorded in groundwater samples. Of note were elevated concentrations of TPH which were recorded in groundwater from BH09-12. The source of this contamination is likely to be a tank recorded on historical maps and requires further investigation. Groundwater within the former petrol station has not been analysed.

**Ground Gas**

11.3.13 Ground gas monitoring was carried out in three boreholes on one occasion. Carbon dioxide was recorded at concentrations of up to 12%v/v and methane up to 24.5%. The high methane concentration is likely to be associated with hydrocarbon contamination within the Terrace Gravels. Although no visual or olfactory evidence of hydrocarbon contamination was recorded on the borehole log by Soiltechnics, this borehole is located in close proximity to BH09-12 which recorded elevated concentrations of TPH in groundwater. Low flow rates (0 l/hr) were recorded. Boreholes were screened within the Made Ground and Kempton Group  | Very stiff fissured bluish grey mottled red and brown sandy clay becoming a soft gravelly sandy clay with depth. Sandy clayey gravel overlying purple ironstone (1.1m thick) present at base | 7.3-10.4 (ave 9.0m) | Minor Aquifer
---|---|---|---
Thanet Sands  | Very dense light brown mottled grey fine to medium sand | 15m?? | Minor Aquifer
Chalk  | unproven | Major Aquifer |
Potential Sources of Contamination

11.3.14 The potential sources of contamination identified from both the desk study information and ground investigations are summarised in Table 11.7.

Table 11.7: Potential Sources of Contamination

<table>
<thead>
<tr>
<th>Potential Source</th>
<th>Location</th>
<th>Potential Contaminants of concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Made Ground (demolition debris, in filled cellars, former and current industrial land uses inc. steelworks, car workshops &amp; engineering works etc)</td>
<td>Site Wid</td>
<td>Heavy metals, other inorganic contaminants, asbestos, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), semi-volatile and volatile organic compounds (SVOC &amp; VOC), PCB oils, carbon dioxide, methane gases</td>
</tr>
</tbody>
</table>
Tanks, oil drums (including Diesel, unknown storage) | Site Wide | Numerous fuel storage areas (potential tanks as identified by historical maps, observed above ground storage tanks & oil drums) located across the site. Not all locations have been investigated due to ownership issues or site constraints.

Heavy metals, other inorganic contaminants, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), carbon dioxide, methane, semi-volatile and volatile organic compounds (SVOC & voc), PCB oils and solvents.

| Northern Development Area | Moderate hydrocarbon odour and staining observed at water table in soil within TP09-02. Slight oil odour (similar to tarmac) noted in Made Ground within WS10. All TPH & BTEX concentrations recorded < residential and commercial industrial screening criteria. Occasional B(a)P concentrations > residential screening criteria but not within hotspot locations.

Slight oil sheen observed on purged ground water from BH09-01 location in close vicinity to oil drums and above ground storage tank. Elevated TPH concentrations recorded in groundwater sampled from BH09-04. B(a)P and PAH (DW4) concentrations > UK DWS in WS10.

| Stadium Development Area | Elevated concentration of TPH were recorded in groundwater from BH09-12

Electrical Substations | Site wide | PCBs and Mineral Oils

Not all substation locations have been investigated due to access constraints.

| Northern Development Area | No visual/olfactory evidence of PCB contamination observed in soil or groundwater. PCB concentrations recorded below laboratory detection limit in soil samples analysed.

| Stadium Development Area | No visual/olfactory evidence of PCB contamination observed in soil or groundwater. PCB concentrations recorded below laboratory detection limit in soil samples analysed.

### 11.4 Inherent Design Mitigation

#### 11.4.1 The design calls for excavation of a basement and lowering of current site levels as part of the construction works. Complete removal of the near surface Made Ground in the area of the basement and partial removal in other areas will likely remove significant areas of Made Ground with the potential to be impacted by the sources identified in Table 11.7.
11.5 Potential Environmental Impacts and Effects

11.5.1 The potential impacts of the potential presence of contaminants within and around the site are considered for both construction and operational phases. The potential impacts in both of these phases are assessed against the pre development situation.

Construction

11.5.2 Conditions during the construction phase differ from the current situation and operation phases in that materials could be exposed to agents such as water and air that could lead to dispersion of contaminants in the environment and to direct contact with construction personnel. Site specific source pathway receptor linkages for the construction stage of the Project have been considered with respect to the identified contamination sources, the future uses of the Project Site and the potential linking pathways. Site specific receptors and pathways for the construction are described in Table 11.8.

Table 11.8: Potential contamination receptor pathways - construction

<table>
<thead>
<tr>
<th>Receptor type</th>
<th>Receptor</th>
<th>Pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Health</td>
<td>Construction Workers</td>
<td>Direct contact and dermal uptake, soil and dust ingestion, dust and vapour inhalation (outdoor air), gas migration/accumulation.</td>
</tr>
<tr>
<td></td>
<td>Site users (commercial and industrial)</td>
<td>Vapour/gas/dust inhalation (indoor and outdoor air) and gas migration/accumulation.</td>
</tr>
<tr>
<td></td>
<td>Adjacent site users</td>
<td>Vapour/gas/dust inhalation (indoor and outdoor air) and gas migration and accumulation.</td>
</tr>
<tr>
<td>Natural Environmental</td>
<td>Kempton Park Gravels (Minor Aquifer)</td>
<td>Vertical migration boa permeable strata.</td>
</tr>
<tr>
<td></td>
<td>River Mousell</td>
<td>Vertical and lateral migration via permeable strata.</td>
</tr>
<tr>
<td></td>
<td>Flora (offsite)</td>
<td>Plant uptake due to dust generation.</td>
</tr>
</tbody>
</table>

Note: The Chalk Major Aquifer has not been included as a potential receptor within the impact assessment given its depth (40m bgl) and the significant thickness of impermeable London Clay (20-25m) separating it from the Minor Aquifer. There is therefore no plausible pollutant linkage between any near surface contamination and the Chalk Major Aquifer.

11.5.3 During the development of the Project Site, construction workers could come into contact with potentially contaminated Made Ground and natural soils/ strata. Fire and explosion hazards are also present due to the potential presence of ground gas (methane, carbon dioxide).

11.5.4 Site users, adjacent residents and members of the public could be affected by contaminated dust generated by the Project development works on site unless appropriate mitigation measures are employed. Fire and explosion hazards are present due to the potential migration and accumulation of ground gas (methane, carbon dioxide) both on and offsite. Similarly there is a potential that offsite flora could also be affected by deposition of dust generated on site.

11.5.5 The Kempton Park Gravels Minor Aquifer could be affected by the increased leaching of contaminants
from the Made Ground and contaminated natural soil material if it is disturbed, or the cover thickness is reduced as part of the construction process. It may also be impacted during piling via the creation of preferential pathways, or the driving of contaminants down into the aquifer. Where excavated, contaminated soil is stockpiled on site, rainwater could percolate through the stockpile and leach contaminants increasing the contaminant loading within the underlying groundwater.

11.5.6 The use of fuel for machinery and vehicles, paints and other chemicals/solvents during construction poses a risk to groundwater from potential spills.

11.5.7 The significance of these identified potential impacts is outlined below Table 11.9.

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Receptor sensitivity</th>
<th>Impact</th>
<th>Magnitude of change</th>
<th>Significance of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction workers</td>
<td>Medium</td>
<td>Health impacts from direct contact, dermal uptake, soil &amp; dust ingestion, gas vapour inhalation, migration &amp; accumulation.</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
<tr>
<td>Adjacent site users and members of the public</td>
<td>High</td>
<td>Health impacts from inhalation and ingestion of contaminated dust particles.</td>
<td>Small</td>
<td>Moderate (adverse)</td>
</tr>
<tr>
<td>Site users (commercial)</td>
<td>Medium</td>
<td>Health impacts from inhalation and ingestion of contaminated dust particles.</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
<tr>
<td>Minor Aquifer</td>
<td>Medium</td>
<td>Degradation of groundwater via increased leaching and mobilisation of contaminants.</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
<tr>
<td>Minor Aquifer</td>
<td>Medium</td>
<td>Degradation of groundwater via the creation of temporary preferential pathways, or the driving of contaminants down into the aquifer.</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
<tr>
<td>Minor Aquifer</td>
<td>Medium</td>
<td>Degradation of Minor Aquifer and River Mousell via fuel spills &amp; other chemicals (eg paints &amp; solvents)</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
<tr>
<td>River Mousell</td>
<td>Low</td>
<td>Degradation of water quality via increased leaching and mobilisation of contaminants within shallow groundwater.</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
<tr>
<td>Adjacent Flora</td>
<td>Low</td>
<td>Exposure to phytotoxic contaminated materials (deposited as dust) that could inhibit / prevent plant growth.</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
</tbody>
</table>

**Occupation**

11.5.8 The Project will comprise a stadium at the centre, with residential elements (hotel and apartments), car parking and retail within the southern part of the site. Various other retail and commercial buildings are proposed across the site. The Project will also include infrastructure, including roads and pavements, car
parking areas/buildings, service/ utility installations and drainage systems. There is minimal soft landscaping proposed with a few trees across the site. A two storey basement car park is proposed beneath the apartments at the south of the site and beneath the north, east and west stands of the stadium. Site specific receptors and pathways are described in Table 11.9.

<table>
<thead>
<tr>
<th>Receptor Type</th>
<th>Receptor</th>
<th>Pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Health</td>
<td>Site end users – Residential (without plant uptake), Stadium users, maintenance workers and commercial/industrial.</td>
<td>Vapour/gas inhalation, migration &amp; accumulation (indoor and outdoor air), direct contact, dermal ingestion.</td>
</tr>
<tr>
<td></td>
<td>Adjacent site users – Residential (with plant uptake), school users, and Commercial/industrial.</td>
<td>Vapour/gas inhalation, migration &amp; accumulation (indoor and outdoor air)</td>
</tr>
<tr>
<td>Natural Environment</td>
<td>Kempton Park Gravel Minor Aquifer</td>
<td>Vertical migration via permeable strata</td>
</tr>
<tr>
<td></td>
<td>River Mousell</td>
<td>Vertical and lateral migration via permeable strata</td>
</tr>
<tr>
<td>Built Environment</td>
<td>Underground services, structures</td>
<td>Direct contact</td>
</tr>
</tbody>
</table>

11.5.9 The Project introduces a new receptor (residential users) to the southern portion of the site. Future site users (including maintenance workers) could be adversely impacted due to gas migration/accumulation into new buildings onsite. Maintenance workers could also be adversely impacted by ingestion of contaminated dust/soil or dermal contact. As the majority of Project will be hard standing (soft landscaping comprises of a few trees only) the source receptor pathway is broken, and hence there is limited potential for uncontrolled exposure with contaminated soil for future site users.

11.5.10 Built structures and infrastructure of the project could be affected by the presence of contaminants in the underlying soils, particularly aggressive determinands (e.g. sulphates, chlorides, acids) certain organic contaminants, soil gases and volatile organic compounds. Typically, where these contaminants are encountered at elevated concentrations, significant erosion of concrete and steel foundations can occur along with the deterioration of plastic services such as water supply pipework etc.

11.5.11 Similarly future activities of the Project during the operation could impact on soil and groundwater conditions beneath the site. Examples of this include the potential for spillage and/or loss from heating and cooling units, fuel storage, electricity substations, and the subsequent contamination of underlying soils and groundwater.

11.5.12 As part of the Project, any below ground storage tanks encountered (including those associated with the former fuel station) will be removed. By removing these potential sources of contamination, this will provide a minor beneficial impact to the Minor Aquifer.

11.5.13 The significance of the potential impacts associated with the operational stage of the Project is presented in Table 11.10.
<table>
<thead>
<tr>
<th>Receptor</th>
<th>Receptor Sensitivity</th>
<th>Impact</th>
<th>Magnitude of change</th>
<th>Significance of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site users (residential)</td>
<td>High</td>
<td>Health impacts from gas/vapour inhalation. Fire and explosion from gas migration/accumulation.</td>
<td>Medium</td>
<td>Major (adverse)</td>
</tr>
<tr>
<td>Site users (stadium users)</td>
<td>Medium</td>
<td>Health impacts from gas/vapour inhalation. Fire and explosion from gas migration/accumulation.</td>
<td>Medium</td>
<td>Moderate (adverse)</td>
</tr>
<tr>
<td>Site users (commercial)</td>
<td>Medium</td>
<td>Health impacts from gas/vapour inhalation. Fire and explosion from gas migration/accumulation.</td>
<td>Medium</td>
<td>Moderate (adverse)</td>
</tr>
<tr>
<td>Adjacent site users (residential/school users)</td>
<td>High</td>
<td>Health impacts from gas/vapour inhalation. Fire and explosion from gas migration/accumulation.</td>
<td>No Change</td>
<td>Negligible</td>
</tr>
<tr>
<td>Adjacent site users (commercial)</td>
<td>Medium</td>
<td>Health impacts from gas/vapour inhalation. Fire and explosion from gas migration/accumulation.</td>
<td>No Change</td>
<td>Negligible</td>
</tr>
<tr>
<td>Site users (residential)</td>
<td>High</td>
<td>Health impacts from direct contact, dermal uptake, soil ingestion and dust.</td>
<td>No Change</td>
<td>Negligible</td>
</tr>
<tr>
<td>Site users (commercial)</td>
<td>Low</td>
<td>Health impacts from direct contact, dermal uptake, soil ingestion and dust.</td>
<td>No Change</td>
<td>Negligible</td>
</tr>
<tr>
<td>Maintenance workers</td>
<td>Medium</td>
<td>Exposure to contaminated materials beneath hardstanding and within service trenches during future services construction. Health impacts from direct contact, dermal uptake, soil ingestion and dust. Fire and explosion from gas migration/accumulation.</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
<tr>
<td>Minor Aquifer</td>
<td>Medium</td>
<td>Ongoing degradation of groundwater quality from existing contamination.</td>
<td>Small (beneficial)</td>
<td>Minor (beneficial)</td>
</tr>
<tr>
<td>Minor Aquifer</td>
<td>Medium</td>
<td>Degradation of groundwater quality via creation of permanent preferential pathway during piling.</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
<tr>
<td>Minor Aquifer</td>
<td>Medium</td>
<td>Leaching of stored chemicals, fuels, oils in commercial eg substations)</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
<tr>
<td>Minor Aquifer</td>
<td>Medium</td>
<td>Degradation of groundwater via fuel spills in carparking areas.</td>
<td>Small</td>
<td>Minor (adverse)</td>
</tr>
<tr>
<td>River Mousell</td>
<td>Low</td>
<td>Degradation of water quality via</td>
<td>Small</td>
<td>Minor</td>
</tr>
</tbody>
</table>
### Additional Mitigation, Compensation and Enhancement Measures

#### 11.6.1 Mitigation measures have been derived by assessing the risks to human health and the environment identified in previous ground investigations in accordance with CLR11.

#### 11.6.2 It is recognised that there will always be an element of uncertainty about the ground conditions including contamination. This potential for currently undetected contamination to be present must therefore be taken into account in the impact assessment presented here.

### Construction

#### 11.6.3 The following mitigation measures (Table 11.11) will be managed through the site specific Construction Environment Management Plan (CEMP) which will need to be completed by the contractor prior to construction.

#### 11.6.4 The mitigation strategies implemented should be reviewed regularly to best suit the practices currently being undertaken on site.

<table>
<thead>
<tr>
<th>Table 11.11 Construction impact mitigation measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risk</strong></td>
</tr>
<tr>
<td>Direct contact with contaminants in the Made Ground and potential contaminated soil during site development</td>
</tr>
<tr>
<td>Health impacts from inhalation and ingestion of contaminated dust particles Impacts to adjacent flora from exposure to phytotoxic contaminated dust particles</td>
</tr>
<tr>
<td>Gas migration/ accumulation</td>
</tr>
</tbody>
</table>
Historical site investigation data (Soiltechnics) suggests there is potential for exposure to moderate levels of CO2 and CH4 in the stadium Project area. Further investigation in this area will be carried out prior to Project development.

Appropriate use of PPE and safe working procedures in any below ground/confined space work.

Degradation of Minor Aquifer and River Mousell via increased leaching and mobilisation of contaminants

Excavation associated with basement carpark, infrastructure and pile caps so stockpiling of soil is likely. Where excavation of grossly contaminated soils (if encountered) is required (as part of remedial measures) stockpiling of this material will be avoided if possible. Stockpiles will be covered when not in use and placed on impermeable sheeting/hardstanding.

Pollution control measures will be implemented by the contractor where required and spillage containment will be present on site at all times.

Degradation of Minor Aquifer via creation of temporary preferential pathway or driving of solid contaminants into the underlying aquifer during piling.

Development of a foundation works risk assessment and the adoption of appropriate piling methods/design to mitigate risk. The impact to the Chalk Major Aquifer from piling has not been assessed. This is because piles will not breach the Lambeth Group, the nature and extent of expected contamination, and the depth of the Major Aquifer. There is therefore no requirement for a Foundations Work Risk Assessment as outlined in NGWCLC Report NC/99/73.

Degradation of Minor Aquifer and River Mousell via fuel and chemical spills.

Control measures will be implemented by the contractor on re-fuelling activities, storage of fuels and chemicals and vehicle movements and parking. Spill response measures will be implemented by the contractor and spillage containment will be present onsite at all times.

Operation

11.6.5 In order to avoid, reduce and minimise any significant adverse effects related to the ground conditions across the site, mitigation controls must be considered from the beginning of the detailed design phase. This will enable mitigation to be embedded in the design and therefore minimise the need for active controls during occupation. Based on the current information, the following measures (Table 11.12) to mitigate operational impacts have been proposed.
### Table 11.12 Operational mitigation measures

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigation measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health impacts, explosion &amp; fire from gas/vapour inhalation, migration &amp; accumulation.</td>
<td>Adoption of appropriate remedial action/ design required prior to development. Incorporation of gas protection measures where building design does not provide sufficient mitigation i.e. basement car park areas. Site investigation data suggests there is potential for exposure to moderate levels of CO2 and CH4 in the stadium Project area.</td>
</tr>
<tr>
<td>Health impacts from direct contact, dermal uptake, soil ingestion.</td>
<td>Adoption of appropriate remedial measures required prior to development. Construction of clean backfill service trenches, and provision of PPE where required.</td>
</tr>
<tr>
<td>On-going degradation of Minor Aquifer and River Mousell via leaching existing contamination</td>
<td>Adoption of appropriate remedial measures required prior to development.</td>
</tr>
<tr>
<td>Degradation of Minor Aquifer via creation of permanent preferential pathway during piling.</td>
<td>Foundation works risk assessment and the adoption of appropriate piling methods/design to mitigate risk. The impact to the Chalk Major Aquifer from piling has not been assessed. This is because piles will not breach the Lambeth Group the nature and extent of expected contamination, and the depth of the Principal Aquifer. There is therefore no requirement for a Foundations Work Risk Assessment as outlined in NGWCLC Report NC/99/73.</td>
</tr>
<tr>
<td>Potential corrosion/damage of building materials and services</td>
<td>Adoption of appropriate remedial measures required prior to development. Specific mixes of concrete could be required for building foundations where the underlying ground conditions are identified as being potentially corrosive to concrete. Specific pipe materials may be required where the underlying ground conditions are identified as being potentially toxic, corrosive or high in organic contaminants. Consultation with Thames Water will be carried out in order to determine suitable pipe materials for water supply.</td>
</tr>
<tr>
<td>Degradation of Minor Aquifer and River Mousell via leaching of stored chemicals and fuels in commercial areas.</td>
<td>All fuels and chemicals used within the proposed development will be stored and used in accordance with current regulatory and industry guidance. For example, all fuels will be stored within 110% bunded areas, all chemicals will be stored on appropriately sized drip trays located on hardstanding within dedicated chemical storage areas as a minimum and safe working procedures will be adopted to minimise spillage through accidents etc. Adoption of safe working procedures. All electricity</td>
</tr>
</tbody>
</table>

Tottenham Athletic Football Club Limited  
September 2015  
11.17
Degradation of Minor Aquifer and River Mousell via fuel spills in car parking areas

An oil/water interceptor and surface water drainage system in accordance with current regulatory and industry guidance to be installed within all new car parking areas.

### 11.7 Assessment Summary and Residual Environmental Impacts and Effects

11.7.1 Potential adverse impacts identified have been addressed and mitigation measures proposed to minimise the scale of any impact on the receptors. For all of the adverse impacts identified, the residual impact after mitigation has been incorporated will be negligible.

11.7.2 Steps will be taken to ensure that good practice procedures both in construction and health and safety during the Project site development and any required remediation will be adhered to. Environmental management procedures should be outlined in a site specific Environmental Management Plan (EMP) to be agreed with the Environment Agency and Haringey Council prior to commencing the works.

11.7.3 No cumulative impacts have been identified that require mitigation.

11.7.4 A summary of residual impacts is set out in Table 11.13.
<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance</th>
<th>Additional Mitigation</th>
<th>Residual Impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct contact with contaminants in the Made Ground and potential contaminated soil during site development</td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td>Appropriate use of personal protective equipment (PPE) and safe working procedures. Construction workers should remain vigilant of ground conditions at all times and should report any suspect areas of potential contamination.</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td>Health impacts from inhalation and ingestion of contaminated dust particles Impacts to adjacent flora from exposure to phytotoxic contaminated dust particles</td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td>During both demolition and construction phases of work, dust suppression measures will be employed by the contractor when necessary to prevent the potential generation of contaminated dust particles and migration off site.</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td>Gas migration/accumulation</td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td>Site investigation data suggests there is potential for exposure to low levels of CO2 in any confined spaces in the northern Project area. There is limited potential for accumulation to hazardous concentrations due to consistently low flow rates and the nature/extent of Made Ground. Historical site investigation data (Soiltechnics) suggests there is</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
</tbody>
</table>
potential for exposure to moderate levels of CO2 and CH4 in the stadium Project area. Further investigation in this area will be carried out prior to development.

Appropriate use of PPE and safe working procedures in any below ground/confined space work.

| Degradation of Minor Aquifer and River Mousell via increased leaching and mobilisation of contaminants | Medium | Negative | Medium | Moderate | Excavation associated with basement carpark, infrastructure and pile caps so stockpiling of soil is likely. Where excavation of grossly contaminated soils (if encountered) is required (as part of remedial measures) stockpiling of this material will be avoided if possible. Stockpiles will be covered when not in use and placed on impermeable sheeting/hardstanding. Pollution control measures will be implemented by the contractor where required and spillage containment will be present on site at all times. | Low | Minor |
| Degradation of Minor Aquifer via creation of temporary preferential pathway or driving of solid | Medium | Negative | Medium | Moderate | Development of a foundation works risk assessment and the adoption of appropriate piling methods/design to mitigate risk. The | Low | Minor |
| contaminants into the underlying aquifer during piling. | impact to the Chalk Major Aquifer from piling has not been assessed. This is because piles will not breach the Lambeth Group, the nature and extent of expected contamination, and the depth of the Major Aquifer. There is therefore no requirement for a Foundations Work Risk Assessment as outlined in NGWCLC Report NC/99/73. | Medium | Negati ve | Mediu m | Moder ate | Very Low | Minor |

Degradation of Minor Aquifer and River Mousell via fuel and chemical spills. | Control measures will be implemented by the contractor on re-fuelling activities, storage of fuels and chemicals and vehicle movements and parking. Spill response measures will be implemented by the contractor and spillage containment will be present onsite at all times. | Medium | Negati ve | Mediu m | Moder ate | Very Low | Minor |
12. Townscape and Visual Amenity

12.1 Introduction

12.1.1 This chapter of the ES has been produced by The Landscape Partnership to assess the suitability of the Project in relation to the effects it would have on the landscape character and features of the Project Site, the local and wider landscape character and changes to views.

12.1.2 In defining ‘landscape’ reference is made to the adopted definition agreed by the European Landscape Convention (Florence: Council of Europe 2000), which states that the landscape is ‘an area, as perceived by people who’s character is the result of the action and interaction of natural and/or human factors’. Given the predominance of human factors over natural factors within the Project Site, and that the term ‘landscape’ is most commonly used to relate to areas of land beyond built up areas, the term ‘townscape’ is used instead. The Chapter provides a description of: the existing townscape and built features within the Project Site and immediate vicinity; the key characteristics of the local townscape character and how these relate to the Site; the contribution that these features have within views; and the presence of statutory or local townscape and visually related designations.

12.1.3 The assessment will also set out the following:

- the loss or damage to natural and built features and the perceived change to the character of the townscape resulting from the Project;
- the capacity of the townscape to accommodate the type of Project;
- the extent to which the Project would be visible; and
- where visible, assessing how the view would change in relation to a range of visual receptors.

12.2 Assessment Criteria and Methodology

Previous Assessment

12.2.1 As part of the Environmental Statement (ES) prepared for the planning application (HGY/2010/1000) submitted in May 2010, and consented in September 2011, a townscape and visual assessment was undertaken. This incorporated the assessment of 30 viewpoints and 10 townscape character areas to ascertain the effects of construction of the proposed stadium, Northern Development (existing Sainsbury’s Store), and Southern Development (enabling residential development). The assessment concluded that the existing townscape was of variable quality and sensitivity, with the only location of high sensitivity being Tottenham High Road, which itself was of relatively poor condition. In the main the proposals were considered a beneficial change to the townscape, improving the public realm, increasing permeability, enhancing townscape character, and introducing a distinctive landmark buildings. The nature and extent of view afforded varied noticeably depending on the street scene and the presence of public open space. The presence of detractive built features and overall visual cohesiveness of the features within the view, influenced whether proposals would be experienced as a beneficial or neutral (i.e. an equal balance of beneficial and adverse changes to the view). The only adverse changes to views recorded would be during the construction phase in Year 1 from Viewpoint 10. The significant changes to
views would occur along Tottenham High Road or adjoining streets (Whitehall Street, Brereton Road, Bromley Road, Vicarage Road/Park Lane, Trulock Road, Worcester Avenue), and from limited locations with Bruce Castle Park, Tottenham Marshes, and open space adjacent to Lea Valley School. A number of other viewpoints were assessed as either not being affected or negligibly effected (2, 3, 4, 5, 6, 10, 12, and 30).

12.2.2 An Addendum to the ES was submitted in December 2011 to cover the proposed changes to the Northern Development, which included the extension of the existing floorspace above the foodstore and the addition of a further floor. A further Addendum to the ES was submitted in December 2011 for the proposed changes to the Southern Development. The proposed redesign and reconfiguration of the proposed building made a number of changes that would have a localised effect on townscape character and views. The two Addendums included the assessment of the effects on the townscape and views that would result from the proposed changes compared with the 2011 consented development. The Addendums concluded that for the Northern Development the effects where geographically constrained and limited to a medium-low neutral significance, and for the Southern Development the effects would largely be of medium neutral significance, but highly beneficial from certain locations.

**Scoping Opinion**

12.2.3 Although a formal Scoping Opinion was not sought the Scope of the EIA was based on the technical scope for the original 2010 ES and the Southern Addendum. A draft Scoping Report was sent to the Council on the 19th June 2015, for their informal comments and discussion. No informal comments were received. However, a note setting out the proposed approach to the identification of viewpoints and the visual assessment was issued to the Case Officer at LB Haringey on 26/06/15. The case officer responded on 10/07/15 stating that the viewpoints were acceptable.

**Legislative Context**

12.2.4 There is no specific legislation relating to landscape and visual assessments or statutory landscape or visual designations that would be affected by the Project. Listed buildings and conservation areas are assessed within Chapter 8.

12.2.5 Trees protected by Tree Preservation Orders (TPOs) are covered by Part VIII of the Town and Country Planning Act 1990 and as amended by the Town and Country Planning (Tree Preservation) (England) Regulations 2012. Further minor amendments have been included within the Planning Act 2008 and Localism Act 2011. TPOs provide a mechanism for trees of public amenity value to be protected by a Local Planning Authority (LPA), and can cover individual trees, groups of trees or woodlands. An Order prohibits: cutting down; topping; lopping; uprooting; wilful damage; and wilful destruction, without the written consent of the LPA or as deemed consent where forming part of approved planning application. Similar status and protection is given for trees within conservation areas that are not protected by a TPO, as covered under the provisions of Section 211 of the Town and Country Planning Act 1990.

**Planning Policy and Guidance**

**National Planning Policy**

12.2.6 The National Planning Policy Framework (NPPF), March 2012 states a presumption in favour of
sustainable development, defined as a ‘golden thread running through both plan-making and decision-taking’, with a requirement for Local Planning Authorities (LPAs) to positively meet the development needs within their area. To achieve this, support is given to sustainable developments that make a positive improvements to the quality of the built, natural and historic environment, including replacing poor design with better design and widening the choice of high quality homes. This is also further reinforced within paragraph 49 with regard to housing applications. Reference is also made to the important role that leisure facilities and residential developments play in the vitality of town centres. Provision of shared space and community facilities, including sports venues, are also identified as enhancing the sustainability of communities and residential environments.

12.2.7 The guidance puts an emphasis on the importance of up-to-date Local Plan policies in which developments should be determined. Where this is absent, permission should be granted unless there should be a clear indication that adverse impacts would significantly outweigh the benefits or otherwise indicated within the NPPF.

12.2.8 There is a need for the planning system to contribute to the protection and enhancement of the natural, built and historic environment and for sustainable development to respond positively to this objective. Developments should protect and enhance valued landscapes and areas of scenic beauty. Developments should also seek to provide a design that takes account of the character of different areas and the intrinsic beauty of the countryside and landscape designations in a manner appropriate to their significance. Encouragement is given to the re-use of previously developed land, provided that this is not of high environmental value.

12.2.9 Proposed developments should be based on good design and appropriate landscaping, in particular ensuring the integration of the development into the natural, built and historic environment. Development should be designed to function well and add to the overall quality of the area, optimising the ability to accommodate the development.

12.2.10 Planning Practice Guidance (PPG) provides current guidance by the Department for Communities and Local Government, based on the NPPF. The need for good design to form integral part of sustainable developments is reinforced, delivered through Local Planning Authorities (LPAs) giving greater weight to innovative designs that help raise standards in the locality. Good design should be multifunctional, sympathetic blending of uses, and enhance buildings and spaces through form and function. Development design should seek to promote or enhance the character of the townscape, including responding to and reinforcing locally distinctive patterns of development, local heritage and culture, whilst not discouraging appropriate innovation.

12.2.11 The PPG on the Natural Environment provides a broad recognition of the role played by the intrinsic character and beauty of the countryside, and not just designated landscapes. Landscape character assessments are identified as providing an important tool in defining what features contribute to the local distinctiveness of the landscape.

Local Planning Policy


12.2.12 The London Plan in conjunction with Haringey Council’s Development Plan Documents (DPDs) forms part of Haringey’s development plan for the borough. The relevant London Plan polices include:
EIA Environmental Statement
Volume 2: Main Report

- **Policy 2.18 Green Infrastructure**: The Network of Open and Green Spaces: promotes the expansion, quality and management of a network of multifunctional green infrastructure;

- **Policy 3.5 Quality and Design of Housing Developments**: defines for the need for developments to the highest quality and relate to their context and wider environment. Proposals should enhance the residential environment and provide attractive places to live. This should be achieved through design that relates to and enhances: quality of local places; physical context; local character; density; tenure and land use mix; and provision of public open space;

- **Policy 7.1 Building London’s Neighbourhoods and Communities**: sets out objective of creating good quality environments, where neighbourhoods are formed that local communities can relate to and understand. Developments should be designed to provide a mix of uses with layouts that interface with local surroundings to improve access to local infrastructure, including green spaces and the Blue Ribbon Network. It should be noted that part of the Blue Ribbon Network follows the High Street near to the western boundary of the Site, due to the presence of the Moselle Brook. However, the Brook is underground within a culvert that extends the length of the High Street affected, including adjoining streets and would not form a relevant part of this assessment. A clear sense of space should be provided that is safe and secure and meet the principles of lifetime neighbourhoods. New buildings and their interspace, should be designed to ‘reinforce or enhance the character, legibility, permeability and accessibility of the neighbourhood’;

- **Policy 7.4 Local Character**: defines the need for development to have regard to the character of the locality in which it is set i.e. through form, function, pattern, scale, mass and orientation of buildings. Developments should provide a high quality design that responds to these aspects and creates a positive relationship between the urban structure and natural landscape features. In areas of poor or ill-defined character, development should ‘build on the positive elements that can contribute to establishing an enhanced character for the future function of the area’. Developments should relate at a human scale establishing a positive relationship with street level activity and comfortable surroundings. To help define a sense of space and positive future character, proposed buildings should relate to buildings and structures that provide a positive contribution and be informed by the surrounding historic environment. It is recognised that in some locations, the character is well preserved and clear, but in others it is undefined or compromised by unsympathetic development. Characterisation studies can be used to identify the existing character, characteristics of value and a strategy for improving the character of a place;

- **Policy 7.5 Public Realm**: seeks maximise the benefits of the public realm in terms of their quality as spaces, accessibility, contextual relationships, and maintenance. Developments should make the public realm relate to the human scale, providing gateways, focal points/landmarks, and high quality landscape treatment, street furniture and infrastructure;

- **Policy 7.7 Location and Design of Tall and Large Buildings**: provides a careful management of the location and design of tall buildings. Tall buildings will generally be limited to the Central Activity Zone, but can be considered outside this Zone, where the scale and mass of the building would not
adversely affect the character or the area. Particular consideration should be given where Metropolitan Open Land, conservation areas and listed buildings would be affected. The proposed buildings should relate well to the form, proportion, composition, scale and character of the surrounding buildings, urban grain and public realm, particularly at street level. The design should improve legibility, permeability, incorporate the highest standard of architecture and materials, provide a positive street relationship, and emphasise a point of civic and visual significance, enhancing the skyline and image of London. The proposals should make a significant contribution to local regeneration;

- **Policy 7.11 London View Management Framework**: provides a set of strategic views which are to be protected, with developments assessed for its impact on the designated view if falls within the foreground, middle ground or background of the view. Designated View 1 Alexandra Palace to Central London, is designated as a London Panorama. Alexandra Palace is assessed as a view as part of this assessment, with the proposed development occurring in a completely different sector of the wide panoramic view available i.e. due east as opposed to due south;

- **Policy 7.17 Metropolitan Open Land (MOL)**: provides protection from development that have an adverse impact on the openness of an MOL; and

- **Policy 7.21 Trees and Woodlands**: covers the protection, management and planting of trees. Existing trees of value should be retained and any removal should be replaced with appropriate trees, and where suitable with large canopy tree species.

**Current Planning Policy: Haringey’s Local Plan Strategic Policies 2013-2026, March 2013**

12.2.13 The adopted Local Plan: Strategic Policies is the renamed version of the submitted Core Strategy to comply with the NPPF. This forms part of the Local Development Framework (LDF) which provide the policy documents for guiding future growth and development in Haringey. Tottenham Hotspur Football Stadium is identified as one of the local landmarks of the Borough. White Hart Lane and Northumberland Park Neighbourhood forms part of the north-west of the Borough, in which the Site and the adjoining urban areas, between the London Overground railway to the west and another section of London Overground railway to the east, are identified as being an ‘Area of change’. This includes reference to the benefit that will arise from the major redevelopment and expansion of the Tottenham Hotspur Football Club (THFC), which will form part of the regeneration of the wider Northumberland Park area. The Local Plan: Strategic Policies includes the following relevant policies:

- **SP0 Presumption in Favour of Sustainable Development**: sets out the principles contained within the NPPF in relation to considering sustainable development proposals;

- **SP1 Managing Growth**: development will be promoted within Areas of Change, including Northumberland Park and the redevelopment of THFC stadium;

- **SP11 Design**: emphasis is placed on new development enhancing and enriching the built environment, by creating buildings and places of high quality that are attractive and sustainable. This should be achieved through a combination of factors, including: designs that respect the local context, character and historic significance, and contributing to the creation and enhancement of a sense of
place and identity; public realm that is well connected and of high quality; provision of high quality landscaping, including improvements to existing streets and public spaces;

- **SP12 Conservation**: refer to Cultural Heritage (see Chapter 8 of ES). It should also be noted that the policy makes reference for the need to protect the Strategic View from Alexandra Palace to St Paul's Cathedral as part of the London Mayoral ‘London View Management Framework’ Revised SPG, July 2010 and other key local views. Viewpoint 1 provides a view from Alexandra Palace towards the Site. The proposed development lies due east in a completely different sector of the broader views from Alexandra Palace and would not affect the Strategic View to St Paul’s Cathedral, which lies due south. Consideration will also be given to local views, in particular locally important view that contribute to the interest and character of the borough. This could include: from large parks and open spaces e.g. Alexandra Palace and Finsbury Park; historic parks and gardens; Conservation Areas; and views of listed and landmark buildings and monuments. The Council will consider the effect of a development on local views in terms of the compatibility of its setting, scale and massing in relation to the local townscape, landscape and skyline.


12.2.14 The Unitary Development Plan (UDP) forms part of the adopted Local Plan until the remaining documents of the LDF are completed and adopted. Some policies have been superceded by the Local Plan: Strategic Policies, but other policies have been retained as ‘saved policies’. The relevant saved policies are as follows:

- **UD3 General Principles**: requires development proposals to complement the character of the surrounding area and take the opportunity to provide planting and retention of vegetation, in particular trees.

- **OS17 Tree Protection, Tree Masses and Spines**: seeks to improve and protect the contribution that trees make to the local character, including: the use of Tree Protection Orders (TPOs); replacement of non-protected trees were affected by a development; and encouraging tree planting in locations that do not damage underground utilities.


12.2.15 The Development Management Policies (DMP) will form part of the Haringey Local Plan. This is at relatively early stage of preparation, with first part of the consultation process having now been completed, with the next stage of consultation due to take place this autumn.

*Emerging Planning Policy: Site Allocations DPD, January 2014*

12.2.16 Consultation on the Draft Site Allocation DPD was completed in March 2014. The Proposed Submission of the Site Allocation DPD is due to be published this autumn, followed by examination in public and adoption sometime in 2015. The following are relevant to the site:
• **Site Allocation NT2**: Tottenham Hotspur Stadium provides an allocation for the proposed development of the site, based on the consented planning application for the redevelopment of the existing stadium to increase capacity and provision of other ancillary uses, with residential and community/leisure facilities to the south. Beyond the site to the north, inclusion is provided for retail (existing Sainsbury’s Store), education and community uses. Reference is made for need to provide high quality and durable materials for the public realm, and that proposals need to integrate and complement with development within the adjacent site allocations, in terms of coordination of design, massing, materials etc.

• **Site Allocation NT3**: High Road West lies to the west of the site and provide an allocation for a residential-led mixed use development incorporating leisure, retail, employment and open space. This is to be based around the identity established by THFC.

• **Site Allocation NT4**: Estate Renewal in North Tottenham recognises the need for regeneration within North Tottenham, to the north and east of the site, to improve the existing poor quality housing stock and enhance housing choice and overall housing supply. This would include providing improved east-west connections between Tottenham and the Lea Valley Regional Park and review of the existing employment land.

12.2.17 A broader area defined as the Tottenham High Road Area of Change, identifies various improvement areas, including the Bruce Grove/Tottenham High Road District Centre and Tottenham High Road Historic Corridor.

**Guidance: Supplementary Planning Guidance (SPG) 1c Strategic Views**

12.2.18 Published by the London Borough of Haringey to provide detail on the protection required for the strategic views between St Paul’s Cathedral and Alexandra Palace. It identifies four zones of the strategic view for protection: the Viewing corridor; the wider setting; the mid-ground; and the foreground. The Site falls outside all four of these zones.

**Tottenham High Road Historic Corridor Conservation Area Character Appraisal**

12.2.19 The revised appraisal was approved and adopted by the London Borough of Haringey on 9 March 2009. The site falls within the North Tottenham Conservation Area, which forms part of the Tottenham High Road Historic Corridor. The Appraisal document identifies buildings and groups of buildings, which have historic interest and contribute to the character of the Conservation Area.

12.2.20 Specifically in relation to the site, the document identifies that within the North Tottenham Conservation Area the existing football stadium is visible from High Road, in the vicinity of Paxton Road and Park Lane. The large numbers of visitors to the site, particularly on match days, are also seen as significantly influencing the character of the area.

**Conservation Area Appraisal: North Tottenham THI Sub Area, October 2014**

12.2.21 The Appraisal provides an assessment of the architectural and historical interest of the northern part of the Tottenham High Road Historic Corridor, to identify the defining features and elements that make the
THI (Townscape Heritage Initiative) Sub Area distinctive, the value of the historic assets, and to provide guidelines for Local Planning Authorities in terms of planning future change and management. The Appraisal also provides a detailed photographic record and information regarding building condition. The THI Sub Area is composed of Grade II and II* Georgian buildings, interspersed with Victorian locally listed buildings and a mixture of other non-listed buildings, including infill 20th century buildings. Most of the buildings are of architectural interest, but many have been unsympathetically altered, including poorly integrated frontages. However, it is recognised that these mixed commercial premises create a diversity and sense of vibrancy that provides a positive contribution to the character of the area. The Sub Area is generally in poor condition, due to neglect, and is considered fragile and will continue to deteriorate without appropriate management. The new Tottenham Hotspur Football Stadium and the proposed regeneration to the west of the stadium, known as the High Road West Plan, are identified as challenges and opportunities for the historic fabric. There is a recognition that conservation should be a balance of preserving local distinctiveness and character, whilst responding to local communities needs and providing active living spaces. The historic fabric should form the inspiration and cultural capital to provide locally distinctive regeneration.

12.2.22 One of the distinctive aspects is that the Conservation Area forms part of a long established and well-defined corridor. The linear form allows for a sequence of vistas travelling both the north and the south. The busy and sometimes hectic road corridor High Road is experienced together with the varied architectural composition of buildings framing the route.

Baseline Data Collection

12.2.23 Baseline data was collected using a mixture of desk-top collation of available data and field survey work. Data was obtained from available online sources. This included: the MAGIC website (www.magic.gov.uk), a geographical based information service for the natural environmental, managed by Natural England; planning data from Haringey Council (www.haringey.gov.uk). Field surveys involved walking and visiting the areas and viewpoints assessed.

Assessment Methodology

12.2.24 In order to understand how townscape features, townscape character and views would be affected, the assessment uses an objective approach based on the Guidelines for Landscape and Visual Impact Assessment (GLVIA)38. The detailed application of these Guidelines, and the criteria and categories used, are set out in Appendix 12.1: Townscape and Visual Amenity Methodology. The assessment approach determines the significance of the changes to the townscape and views, should the Project proceed. This is achieved by first understanding the relative sensitivity of the site feature, character of the townscape, and the view being experienced, and then combining this with the magnitude or extent of change that would result from the Project. As set out in Chapter 2, changes can be experienced as an adverse or beneficial. In addition, for landscape/townscape and visual assessments, a further category is introduced, that of neutral influence. Neutral effects are regarded as those that would maintain, on balance, the existing levels of the quality, integrity or key characteristics of the landscape and/or visual resource. A neutral effect may therefore arise where beneficial effects offset adverse effects or where the value

judgement would consider the change to be different, but neither a deterioration or an enhancement. Chapter 2 refers to the use of ‘neutral’ in terms of significance of effect. To avoid confusion, the term neutral in Chapter 2 is replaced in this Chapter with either ‘negligible’ or ‘no change’.

12.2.25 The GLVIA advises that level of detail provided should be to a reasonable level sufficient to determine the likely significant effects. This should be ‘appropriate and proportional to the scale and type of development and the type and significance of the landscape and visual effects likely to occur’.

12.2.26 Whilst the process of assessment is often referred to as a Landscape and Visual Impact Assessment, it is important to understand the difference between ‘impact’ and ‘effect’. ‘Impact’ is defined as the action being taken and ‘effect’ as the change resulting from the action. The changes resulting from the implementation of the Project, form the main consideration of this assessment and thus the word effect is mainly used. The two main components are:

- landscape/townscape effects - assessing effects on the landscape/townscape as a resource in it is own right;
- visual effects - assessing effects on specific views and the general amenity of the view.

**Geographical Scope**

12.2.27 An approximate 2km study area was defined to assess the effects of the Project, with this being extended where required to cover elevated promoted locations, as is this case for Viewpoint 1, which is over 4kms from the Site. Geographical Scope is often determined through the use of Zones of Theoretical Visibility (ZTVs), using 3D terrain models to determine where a development potentially could be visible or Zone of Visual Influence (ZVI) an approximation of the extent of visibility based on field survey work to define a region or zone in which it would be possible to view the Project. However, within a major urban conurbation, with complex arrangement of built forms and varying heights, a digital terrain model would be of little use without model data of the existing built form. It is considered impractical and of limited value to create a sufficiently large digital model all the existing built form to provide an accurate ZTV. Similarly, it would be very difficult to define a ZVI that provides a meaningful representation of the ZVI. Consequently, reliance is placed on the field survey work undertaken for the ES submitted as part of the 2010 planning application, to determine an approximate extent of visibility and reliance on a number of representative viewpoints to illustrate the effects from a range of geographical locations and extents.

**Temporal Scope**

12.2.28 Assessment of the effects on the townscape and views is provided for both the Construction Phase and the Operational Phase, based on the periods set out in Chapter 2. During the Operational Phase, temporal effects are considered at Year 1 (fully operational) and Year 15. This is provided to enable the predicted changes arising from the growth of vegetation to be taken into consideration most notably that provided as part of the Project.

**Assumptions and Limitations**

12.2.29 The following assumptions have been made in respect to the assessment of effects:
- the assessment Baseline Year is 2015, Year 1 is 2022 (fully operational) and Year 15 is 2037;
- the Project is regarded as being permanent in landscape and visual terms due to the length of operation. The Project would involve a permanent loss of most existing Site features. Although the urban fabric does not change for long periods of time, buildings are replaced and urban regeneration periodically occurs, as demonstrated by the Project. Consequently, the Project is reversible, but to take account of relatively low likelihood of being reversed, the assessment is based on the Project being partially reversible.
- professional judgement is made on the surveyor’s experience of undertaking LVIAs and predicting the extent of change that could be expected. To assist with this process, the buildings within the Site and study area include features of known height, in which the height of the proposals can be assessed against. This provides a reasonable confidence in the predicted effect;
- existing vegetation will continue to grow at rates appropriate to the location, species and maturity of the vegetation. Other future changes, such as loss of vegetation through weather damage or disease, or future proposed development that have not been given consent at the time of assessment, cannot be predicted and thus do form part of the assessment. Consequently, the assessed effects on site features, landscape character and views are considered as having a high probability of occurring;
- the proposed tree planting would grow at a rate of approximately 400mm/year, based on the average expected growth rates for the selected species growing on imported loamy soils of high fertility. Predicted growth is also based on the assumption that no growth will take place in the first year, as the plants adjust to their new growing environments. This provides a reasonable confidence in the predicted effect;
- the receptor for a view from public road, public open space and within a residential property is an adult standing with an eye height of 1.6m;
- visual effects are assessed on the basis of good visibility. Visual effects can be expected to vary e.g. poor visibility at times of low cloud, rainfall and dusk. At these times a reduction in visual clarity, colour and contrast would be experienced. Reduced visibility would limit the extent of view possible particularly from mid to long distance views. Consequently, the assessment of effects is based on the worst case scenario, where the Project would be most visible; and
- extent of use of public rights of way is based on: known information e.g. if the right of way forms part of a promoted route at a local or national level, signage and; and circumstantial evidence at the time of the survey, e.g. recent disturbance of grass and crops, a clearly defined path, extent of wear, and the number of people using the right of way at the time of the survey. The extent of use of a road is based on the number of vehicles observed using the road at the time of the survey and as could reasonably be expected for the class of road.

12.2.30 In undertaking the assessment, other than the Project Site, private property has not been accessed, as it is generally considered impractical to seek approval to gain access to residential properties or other buildings to assess the effect on views from windows in a property or adjoining land. Assessment is therefore based on the nearest publicly accessible location, which will usually be a road or public right of
way or from views within the Site looking outwards. Professional judgement is therefore required as to what the likely effect on views would be from windows, making allowances for changes in height e.g. from a first or upper floor windows.

**Townscape**

12.2.31 The townscape character assessment describes the underlying topography and broad characteristics of the built environment and the impact that the Project would have on this character. It assesses the effect on the various components, which contribute to the overall urban environment such as buildings, townscape and visual characteristics, within a defined local urban area surrounding the site up to 1km from the Project Site.

12.2.32 The physical boundary for the townscape study was established by walking and driving throughout the locality and establishing appropriate edges. The appropriate extent of the study area was as follows:

- To the north: Up to Bridport Road, Shaftesbury Road and Brantwood Road;
- To the south: 200m south of Junction of Bruce Grove with High Road;
- To the west: Bruce Castle Park and Tottenham Cemetery; and
- To the east: Watermead Way.

12.2.33 The methodology for the townscape assessment has been drawn from some of the terminology and guidance found within two further documents:

- CABE By Design (May 2000); and
- Guidance on the Methodology for Multi-Modal Studies (GOMMMS).

12.2.34 ‘By Design’ aims to promote higher urban design, by supporting existing planning guidance. As part of this process, it sets out the basis for defining the fundamental elements that create the urban form. GOMMMS aims to set out a methodology for undertaking studies into transport issues, so that transport problems can be effectively identified and analysed and appropriate solutions defined for an integrated approach to transport and land use. Within this, GOMMMS provides a basis for assessing townscape. This is similar to those used in ‘By Design’, but also includes ‘townscape indicators’, which can be used as a way of determining townscape value. Whilst intended for transport projects, GOMMMS does provide some useful guidance for assessing townscape.

12.2.35 The baseline study for the townscape assessment identifies specific and distinct aspects of townscape character, in terms of the following:

- **layout: structure & urban grain** – urban structure is the framework of routes and spaces, and the way developments, routes and open spaces relate to each other, and includes density and mix of uses. Urban grain measures the pattern of street blocks and plots and is assessed in terms of fine and coarse grain;

- **scale: size and massing** – the size of buildings in relation to their surroundings, in particularly to a person at ground level, and the massing of buildings, expressed through arrangement, volume and shape;
12.2.36 Description of the Townscape Character Areas also consider and use the following terminologies:

- **appearance & aesthetic quality: details and richness** – facades, styles, fenestrations, building techniques, decoration, rhythm and pattern, materials (local/regional, colour, texture, pattern, etc.), and the amount to which they are used to create visual interest and create aesthetic quality; and

- **natural features** – landform, vegetation, watercourses, wildlife, setting and form, and microclimate.

12.2.37 The impact of the Project has been assessed in terms of the height, mass and appearance of the proposed buildings on the wider urban context and the impact of the buildings on the immediate townscape environs in terms of the particular qualities, character and structure of the areas identified in the baseline study.

12.2.38 It should be noted that a general assessment of impact on the character of Conservation Areas has been undertaken in this section of the ES, however a more detailed analysis of the effect on the historical aspect of the Conservation Area and effects on any associated listed buildings is covered under Chapter 8, Cultural Heritage.

**Views**

12.2.39 To assist the reader, viewpoints are provided to demonstrate the range of available views for a variety of receptors, and geographical locations. The GLVIA refers to three types of viewpoint, which are set out and utilised as described below.

- **Representative Viewpoint** – provides a viewpoint that may be considered as typical or similar to a
particular location and where the significant effects are unlikely to differ. It therefore can be considered as being representative of other views e.g. from a Public Right of Way (PROW) or group of houses. Where the viewpoint is not representative of a neighbouring visual receptor, and there would be different significant effects, this is stated.

- **Specific Viewpoint** – illustrates a particular noteworthy or key view. This may be a promoted viewpoint or from a specific visitor attraction, tourist destination, statutory landscape designation, or particular locally valued recreational or cultural landscape associations.

- **Illustrative Viewpoint** – provided to demonstrate particular features, effects or issues. These are used to illustrate: particular Site features; the extent of visibility from within the Site from non-publicly accessible locations; or features that prevent views from certain locations.

12.2.40 The visual assessment undertaken for the ES in 2010 ascertained identified 30 viewpoints. The assessment for the Project utilises the same viewpoint locations, to assist with the comparison of the consented scheme and the current Project. These become the 29 Representative Viewpoints and Viewpoint 1 which is a Specific Viewpoint. Photographs of the existing views are provided within Appendix 12.5 and locations shown on Figures 12.1, 12.2 and 12.3. It should be noted that 7 additional viewpoints have been prepared (Viewpoints 31-37), but these have been prepared for the assessment of effects on cultural heritage and are referred to in Chapter 8. These viewpoints deal with specific issues relating cultural heritage, and whilst providing an additional reference for views, do not provide any substantive additional information in understanding whether the effects on townscape and views would be significant, relative to the previously utilised 30 viewpoints, and are therefore not assessed as part of this Chapter.

12.2.41 Viewpoints typically represent the local geographical area of the vicinity of the viewpoint and different receptor types. The selected viewpoint typically provide the worse-case scenario for a given location, and thus will usually be the same or less. The table also indicates where residential and commercial properties lie adjacent to the viewpoint, but due to the constrained and oblique view that would occur from windows, the direct view provided by the viewpoint would not be representative of the view from the window. Nevertheless, the view can be used as a reference, but with the knowledge that the views from these properties would much less effected or not all.

12.2.42 In order to help determine whether features of the Project would be visible from mid to long distance views, existing buildings and taller residential tower blocks within the vicinity of the Site were used as reference points and binoculars used during site visits to help determine the relative scale to features within the Site and the proposed built features.

12.2.43 Assessment of the predicted views was further assisted through the use of 3D modelling, wireframes, photomontages, and elevations of the Project. From the 30 viewpoints, 21 wireline Accurate Visual Representations (AVRs) and 9 photorealistic AVRs were produced, and are incorporated within Appendix 12.5. The additional Viewpoints 31-37 prepared for the assessment of cultural heritage are also provided in Appendix 12.5. These images have been produced by INK, a specialist consultant in visualisations, and the methodology for the production of these images is provided in Appendix 12.2. In addition to provide a comparison with the previously consented scheme a blue line has been added to the AVRs to indicate the outer profile/rooﬂine of the built form of the consented scheme.
12.2.44 It should be noted that the representations used for the Southern Development outline application, are only illustrative to help the reader understand how the proposals could appear and provide a greater level of confidence in the commitment to provide a high quality development. However, detailed aspects and appearance of this part of the Project illustrated within the AVRs would be subject to further change.

12.2.45 The assessment of views includes the detailed consideration of:

- the proximity of the visual receptor to the Project;
- the extent of visibility or proportion of the Project visible within the wider context of the view;
- the nature and complexity of the existing view and any changes that would affect the skyline;
- elements within the view that may detract from or add to its quality;
- the extent to which the Project occupies the view, and whether a framed view, glimpsed or panoramic view; and
- whether the view would be experienced from a specific fixed location or whether it would form part of a sequence of views when the viewer would be moving, and if from a fixed location, such as a window, whether the Project would form the central focus of the view or a more oblique outlook.

12.2.46 A variety of visual receptors are assessed with a focus on those who are most likely to be concerned about changes to views.

Significance

12.2.47 The following table defines the categories that are used to determine the significance of effect.

**Table 12.1: Significance Matrix**

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<th>Criteria</th>
<th>Sensitivity</th>
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<tr>
<td></td>
<td>Very High</td>
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<tr>
<td>Very High</td>
<td>Substantial</td>
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<tr>
<td>High</td>
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<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Very Low</td>
<td>Moderate</td>
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</tbody>
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12.2.48 Refer to Chapter 2 for definitions of the different significance categories, noting that where Neutral is used in Chapter 2 this equates to Negligible in Table 12.1 above.

12.2.49 The assessment also considers the following aspects, as set out below.

- **Direct and Indirect**: direct effects relate to the changes on the Project Site including re-contouring of landform, loss and addition of vegetation, removal or inclusion of built structures and surface
treatments, etc. Direct effects are also experienced where there are changes to the character of the townscape, where the Project is physically located within a townscape character area. Effects on views are always considered direct. Indirect effects occur where the character is influenced by consequential changes in a neighbouring townscape character area.

- **Seasonal Variation and Duration**: due to the role that vegetation can play in preventing or limiting views, or influencing the character of the townscape, the difference between winter and summer needs to be considered. This is considered by assessing impacts in winter (in the first year following completion) and in summer (after fifteen years).

- **Beneficial, Neutral or Adverse Effects**: adverse effects are those that would be damaging to the quality, integrity or key characteristics of the townscape and/or visual resource. Beneficial effects are those effects that would result in an improvement in the quality, integrity or key characteristics of the landscape and/or visual resource. Neutral effects are those where the effect would be neither beneficial nor adverse or a balance of adverse and beneficial influences.

### Cumulative Development

12.2.50 Major applications within Tottenham, South Tottenham and Haringey, that have been approved or pending a decision in the last five years, have been considered as part of this chapter of the ES. Most of these developments would involve demolition of existing buildings and replacing with buildings that would mainly affect their immediate local context, but would have little material difference in the context of the assessment of the Project. Some of the developments retain the existing façades, and the conversion or partial demolition of parts of the building that would predominantly not be visible to the public and thus would have little or no bearing in a townscape and visual context. There are several developments within the High Road corridor which would largely retain the same or similar building line and form and would have little cumulative effect with the Project. These include:

- **624 High Road**: the height, scale and massing are proportionate to the existing street scene, with a small frontage on the High Road, and sufficiently distant from the Project at approximately 600m to have limited effect;

- **596-606 High Road**: is slightly further to the south from 624 High Road and similarly replaces a building of similar size, scale and mass to that proposed, likewise with a small frontage on to the High Road, and sufficiently distant from the High Road to have limited effect; and

- **638 High Road**: this is an important location within the Conservation Area and on the corner of the key junction of the High Road and Lansdowne Road, that incorporates a former art deco style building from the 1930s and that was severely fire damaged during the Tottenham riots. This has been replaced with a building of similar style and appearance and re-establishes an important local built feature within the street scene. The building has been completed and occupied and forms part of the baseline condition and Viewpoint 15;

12.2.51 The other main developments within or in relatively close proximity to the Project on the High Road are:

- **Former Cannon Rubber Factory**: the existing industrial buildings have been replaced with 5, 6, 9
and 22 storey residential buildings, which have a noticeable influence on local townscape and views of the High Road within the vicinity. The development has now been completed and forms part of the baseline conditions. The changes are largely considered to be beneficial and, where relevant, are referred to as part of the assessment of townscape and views; and

- **Northumberland Development Project:** this is the former consented development for the proposed site and is referred to within the baseline conditions. A comparison with the proposed Project is provided within viewpoint photographs in Appendix 12.5 and referenced within Section 12.7.

12.2.52 The most notable development of significant size, that has a similar scale to the Project, is the former GLS Depot located approximately 1.5km to the south. This major redevelopment involves the demolition of the existing buildings, replacing with mixed uses (residential, student accommodation, hotel, offices, retail, health facilities and school) and the erection of 1 to 18 storey buildings. The development has now largely been completed and provides an important beneficial effect to the local townscape and visual built character. The development has been incorporated as part of the baseline conditions. The changes are sufficiently distant from the Project to have little cumulative effect and is not visible within any of the representative viewpoints, although both developments would be visible from some parts of the Lee Valley Regional Park. Nevertheless, the development does increase the awareness of further tall buildings being introduced into the wider context of the site, and is referred to where relevant within the assessment of effects of the Project.

12.3 Baseline Conditions

**Introduction**

12.3.1 This section sets out the existing situation in relation to townscape and views, including changes since the submission of the ES for the consented development. The baseline therefore includes the built elements of the Northern Development (Application Number HGY/2011/2350) including the foodstore (operated by Sainsbury’s), educational facilities, stadium related uses and associated facilities. A description of the Project Site is set out in Chapter 3.

12.3.2 It is also considered appropriate to give regard to the unimplemented development relating to the consented stadium and Southern Developments, which together cover most of the current Project Site application boundary. The stadium was granted full planning consent and the Southern Development was granted outline planning consent in September 2011 (Application Number HGY/2010/1000). A further outline planning application (Application Number HGY/2011/2351) was submitted in December 2011 revising the proposals for the Southern Development and was consented, subject to Reserved Matters, in March 2012. The baseline situation has changed since the approvals as a result of the demolition of existing buildings to facilitate the construction of the stadium. It is considered appropriate to give regard to the existing consents for the stadium and Southern Development as they represent an approved design against which the current application can be compared. The majority of the text and focus in this Chapter assesses the current proposals in their own right. However, a comparison with the consented development is also provided within Section 12.8.

12.3.3 There are no statutory or local landscape or visual designations within the Project Site or local context. However, there are a number of designations that are of relevance to the assessment of townscape and views. These include: Lee Valley Regional Park; Metropolitan Open Land; Significant Open Land; Green
Chase Open Space; Conservation Areas and Public Rights of Way (refer to Figure 12.2 for location and extent).

**Townscape Site Features**

12.3.4 A number of changes have occurred to Project Site features since the consented scheme. The most notable change is the completion of the Northern Development and the operational use of the Sainsbury’s Store. In addition the remaining buildings within the former Wingate Trading Estate, to the south of the Northern Development, have been demolished leaving the land open in readiness for redevelopment.

12.3.5 Table 12.2 describes the Project Site features and their relative value, susceptibility to change and sensitivity.

<table>
<thead>
<tr>
<th>Site Feature</th>
<th>Description</th>
<th>Townscape Sensitivity: Value</th>
<th>Townscape Sensitivity: Susceptibility to Change</th>
<th>Overall Landscape Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landform</td>
<td>The landform is largely flat, with little visible discernible variations across the site. Landform does not form a defining feature of the site.</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
</tr>
</tbody>
</table>
| Vegetation   | There is very little vegetation within the site. This is limited to the following:  
  - six sycamore trees of 7-8 metres in height on the eastern side of Worcester Avenue. These are grouped closely together in the tarmac pavement, and are of average to poor quality;  
  - a 6m Norway maple with broad canopy to the south west of the site outside the Spurs Store, of moderate condition, but currently of limited visual value;  
  - a 14m sycamore on Park Lane of average condition. Limited space and previous canopy lifting has created a tree of relative poor form.  
  - five relatively young trees planted within the pavement along High Road. Whilst these currently provide limited visual influence within the street scene, they are in good condition and have the potential to provide future value;  
  - a 22m London plane on the western side of the High Road forms a prominent tree in good condition and high quality, that | Medium                        | Medium                         | Medium                         |
<table>
<thead>
<tr>
<th>Site Feature</th>
<th>Description</th>
<th>Townscape Sensitivity: Value</th>
<th>Townscape Sensitivity: Susceptibility to Change</th>
<th>Overall Landscape Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>provides an important local contribution to the street scene;</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>five trees of 8-15m within the rear gardens of 800-810, including Red Horse chestnut, sycamore, Lawson cypress and eucalyptus. Generally of variable condition, average value and provide no visual contribution to the High Road street scene; and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>few small trees in the rear gardens of 26-32 Worcester Avenue.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>With the exception of the single mature London plane on the High Road, the trees within the site are no more than of average value and provide limited visual contribution to the street scene.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Following the demolition of many of the buildings within the site, the centre of the site has a very open appearance, replacing the previously intensely built character of the site. This creates an open street frontage to the High Road, Paxton Road and Worcester Avenue and much greater visual presence to the stadium within the High Road. The remaining buildings incorporate the following:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stadium: predominantly comprises four stands enclosing a playing pitch. The 1920s north and south stands with open metal-framed gantry roof structure built in the 1990s reach 25m in height. The 21m high east stand built in 1934 and 24m high west stand was completed in the 1982 fronted by mainly 3 storey brick built 17th to early 20th century structures. The structure and appearance reflects the various additions and changes, providing a functional character and a relatively discordant architectural mix. The building presents a large prominent built form with little visual relief;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Road (southern section): composed of Warlington House, a Grade II listed building, as well as other locally listed buildings that are primarily three storey</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Site Feature Description

<table>
<thead>
<tr>
<th>Site Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victorian buildings, and in fairly poor visual condition. The one storey Spurs Shop completes the group of buildings;</td>
<td></td>
</tr>
<tr>
<td><strong>High Road (northern section)</strong>: group of buildings coherent and attractive frontage of Grade II or II* Georgian terrace properties, which provide a distinct character to this part of the High Road and Tottenham High Road Historic Corridor. These comprise 790 to 802, 804 &amp; 806 High Road. Although a number are in a relatively poor visual condition they form an important historic and visual part of the street scene; and</td>
<td></td>
</tr>
<tr>
<td><strong>20-32 Worcester Avenue</strong>: row of mid twentieth century bay windowed terraced residential properties providing a unified residential character and appearance to north end of the road.</td>
<td></td>
</tr>
<tr>
<td>Low brick walls and railings define the boundaries with the front gardens of residential properties along Worcester Avenue and Park Lane. These contribute to the street scene, but are general of average appearance and condition. Low brick walls and railings form part of the street frontage of 808-810 and 790-802 High Road. These form an important feature to these group of listing buildings, are of good condition and appearance, and provide an important local contribution to the street scene.</td>
<td>Medium</td>
</tr>
<tr>
<td>Mixed use, incorporating the existing stadium, commercial properties, public houses, residential properties and vacant land.</td>
<td>Medium</td>
</tr>
<tr>
<td>Public access is restricted to the streets of the High Road, Worcester Avenue, Park Lane and Paxton Road.</td>
<td>Medium</td>
</tr>
</tbody>
</table>

#### Townscape Character

12.3.6 Ten Townscape Character Areas have been defined within the study area (refer to Figure 12.4). A description of each TCA is set out in Appendix 12.3. The sensitivity of the TCAs is set out in Table 12.3.
Table 12.3: Townscape Character Sensitivity

<table>
<thead>
<tr>
<th>Townscape Character Area</th>
<th>Landscape Sensitivity: Value</th>
<th>Landscape Sensitivity: Susceptibility to Change</th>
<th>Overall Landscape Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: THFC Stadium</td>
<td>Low</td>
<td>Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>2: Tottenham High Road:</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>3: North Tottenham Low Level Industrial Estates</td>
<td>Low</td>
<td>Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>4: West Tottenham Large Scale Residential</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>5: West Tottenham Linear Residential</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>6: East Tottenham Mixed Linear Residential</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>7: Northumberland Park Discordant Residential</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>8: Bruce Castle Mixed Open Space</td>
<td>High</td>
<td>Very High</td>
<td>High</td>
</tr>
<tr>
<td>9: Lee Valley Large Scale Industrial</td>
<td>Low</td>
<td>Low</td>
<td>Very Low</td>
</tr>
<tr>
<td>10: East Tottenham Large Scale Mixed Development</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
</tr>
</tbody>
</table>

Views

Local Context

12.3.7 The site lies within and adjacent to a number of contrasting townscape areas as described in the previous section. The range of views are illustrated in Viewpoints 1 – 30, with the Viewpoint locations indicated on Figures 12.1, 12.2 and 12.3 and are described in Appendix 12.4. Each Viewpoint is also illustrated by a wireline AVR or photorealistic AVR of the Project (refer to Appendix 12.5). Wirelines indicates the outline of the whole Project to illustrate the location and the extent to which the Project would occupy the view. The AVRs provide a true representation of the change to the view resulting from the Project and are provided to illustrate fully what the change to the view would be.

12.3.8 A fuller description from each of the viewpoints is set out in Appendix 12.4. In terms of the immediate environment adjoining the site this can be summarised as follows:

- to the east there are a number of education uses. These include St Paul’s and All Hallows Junior School, which is largely single storey. There are a number of mature trees in the school grounds. Immediately to the north of this school is Northumberland Park Community School, which includes 2 storey buildings and ‘all weather’ playing pitch surface. A high solid wall marks the school boundary. These educational uses define much of the eastern boundary of the site. Residential properties along local roads include terraced houses, such as along Almond Road, and semi-detached houses with bay windows, such as along Worcester Avenue. Within these roads there are views along the streets...
towards the existing stadium as illustrated by Viewpoints 17 and 19;

- to the south on Park Lane the land use is mainly residential with a number of late Victorian terraced houses, some later 20th century flats and a community centre. Residential properties directly opposite the site currently face the existing stadium providing a dominant feature within the existing view, as typified by Viewpoint 21 (taken from the corner of Park Lane and Vicarage Road). Further west along Park Lane, views from residential properties towards the site become more oblique. Nevertheless, when the site is viewed along the line of the road by pedestrians, cyclists and vehicle users, the existing stadium remains as a dominant feature within the view in winter. Set back from Park Lane, Bromley Road (adjacent to the site), feeds off from Park Lane in an arced alignment allowing prominent views to the top of the South Stand of the existing stadium from various properties and along the alignment of the road, as illustrated in Viewpoint 22;

- to the west the High Road is the main feature, as defined by Viewpoints 16, 23 and 27. On the opposite side of the road there is a mix of uses. The St Francis de Salles Junior School and its playground are located to the south behind a narrow belt of semi mature trees. The red and buff brick Victorian gothic St Francis de Salles RC Church lies directly opposite Bill Nicholson Way and just to the north of this church a 5 storey blocks of flats with a library on the ground floor. Further to the north, there are terraced Victorian properties. These are three storeys high with a single storey section fronting the pavement comprising mixed retail outlets and the full three story element to the rear/west. Leading off the High Road are several minor roads orientated east-west, with views to the east along the roads being directly towards the site, with the properties along the High road defining and truncating the view. Such views are defined by viewpoints 24, 25, 26 and 29; and

- to the north and north-east the residential properties of Northumberland Park and minor roads that feed off this link road define the local visual context, as typified by Viewpoints 17 and 18. There are few views into the site, from residential properties and roads, due to other intervening buildings.

Wider Visual Context

12.3.9 The dense urban character and tight confinement of built frontages to the streets in the wider area largely restricts views to the local street scene, so that even within a neighbouring adjacent parallel street, views towards the site can soon be contained or limited to glimpsed views between properties. Even taller buildings that are visible within a localised setting and relatively short distances are often screened within views, due to the tight context of built frontage to the street itself. Existing larger residential blocks, within the vicinity of the site, have been used within the assessment process to determine the likelihood of future development on the site being visible. In particular the 21-storey Brook House on Cannon Road, 19-storey residential block of Stella House on Tottenham High Road; the 17/19-storey residential block of Kenneth Robbins House on Northumberland Grove; the 10-storey blocks of Ermine House, Moselle House, and Charles House, between Whitehall Road and White Hart Lane; and the 10-storey residential block of Trulock Court on Trulock Road.

12.3.10 Beyond the local context, views of the site in the wider setting typically occur where a road is orientated, so that its axis is directly aligned with the site, as typified by Viewpoints 8 and 15. In areas of open space, where there is an absence of the tight confinement of built form, this opens up wider views, as indicated
in Viewpoint 11. Other viewpoints are included, where there are no views of the existing buildings on the site, but where there may be the potential to see the larger proposed buildings on the site and in terms of road alignment are represented by Viewpoints 4, 9, and 13, and from areas of open space by Viewpoints 5, 6, 7, 10, 12, 14 and 28.

**Extensive Visual Context**

12.3.11 Very long distance viewpoints have also been assessed from key areas of open space, including Alexandra Palace (Viewpoint 1), Parliament Hill (Viewpoint 2), Greenwich Park (Viewpoint 3), and Finsbury Park (Viewpoint 30). Only from Alexandra Palace can the existing stadium be viewed as an element within the view, and this as a barely discernible feature in a much wider panoramic view. With respect to Viewpoints 2, 3 and 30, the existing buildings within the site are not visible from these locations, due to the influence of the intervening changes in landform, buildings and vegetation.

12.3.12 Likewise, in other locations away from these Viewpoints, the changes in landform and built context essentially restricts views of the site in nearly all locations. From other areas of open space, the existing landform, presence of trees, woodland and other buildings largely precludes views of the site.

12.3.13 The sensitivity of each representative Viewpoint is set out in Appendix 12.4.

**12.4 Inherent Design Mitigation**

12.4.1 The main changes that have taken place during the design process to mitigate effects to views and the townscape, relate to the buildings to the south of the stadium and are set out below:

- **Residential Towers**: the location and heights have been changed to ensure that the tallest tower lies closest to the stadium and within the centre of the cluster of towers. To improve the visual massing of the cluster and heights of the towers, Tower C was reduced from 36 to 32 storey, and Tower A from 36 to 24 storey;

- **Building Form**: the proposals reduce the rectilinear massing of the consented residential buildings, experienced from the east and west, by introducing residential towers of varying height, reducing the effect of shadow cast by the buildings onto the public realm; and

- **Building Shape**: the use of a chamfered profile on the lower and upper parts of the towers. This would enable a greater efficiency of space and maximising of the public realm, but would also help reduce the visual massing of the towers. The chamfered profile would be applied to the most prominent outer elevation treatment that would be most visible. Within the top of the towers this would be combined with the garden roof terraces to establish a greater sense of openness, as well as visual interest.
12.5 Potential Environmental Impacts and Effects

Construction

12.5.1 A description of the construction works and phasing of the different elements of the Project is set out in Chapter 5. Impacts during construction of the proposed scheme are expected to involve the following:

- site access and construction traffic;
- demolition works;
- excavation works and material stockpiles;
- piling and pile drivers;
- construction equipment including cranes of varying height depending on structures and timing within the construction process;
- the progressive massing of development;
- utilities works to serve the Project;
- temporary parking;
- site accommodation;
- temporary hoarding and fencing;
- protection of existing features, structures and land uses; and
- lighting of the works.

12.5.2 The effects during the construction phase would not be substantively greater, in terms of size/scale and geographical influence, to that of the effects in Year 1. The main difference during the construction phase from with the occupation phase would be the process of continual change, visual disruption, movement, the visually intrusive appearance of the inner core of new buildings and partial demolition of the existing stadium, and the need for tall cranes to complete specific parts of the Project. With the exception of TCA 1: Stadium, the effects on townscape and views would be adverse. In the case of the former, the change is assessed as neutral, due to the extensive amount of demolition work that has already occurred and is ongoing, and the sense of transition that is taking place within the Area. Most of the removal of the existing townscape site features would occur early on in the construction phase, with the exception for parts of the existing stadium, where there would be a phased approach to its removal. Most of the changes during the construction phase would relate to the construction of the new buildings and the public realm. This would be phased in terms of completion, but would still represent a number of years of construction activity. However, in townscape and visual assessment terms this would be a relatively short period of time compared to the life expectancy of the Project.

12.5.3 The assessed effect on townscape site features, townscape character areas and viewpoints during the construction phase is incorporated within the Summary Table of Effects within Appendix 12.6.
### Occupation: Townscape Site Features

12.5.4 Set out below are the effects on site features.

<table>
<thead>
<tr>
<th>Site Feature Sensitivity</th>
<th>Landform</th>
<th>Description of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td><strong>Year 1 – Winter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size/scale</td>
<td>Negligible</td>
<td>Extensive areas of excavation will be required to construct the basements and building foundations. However, this would make very little visible difference once the Project is operational.</td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Magnitude</td>
<td>Low Adverse</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>MINOR ADVERSE</td>
<td></td>
</tr>
<tr>
<td><strong>Year 15 - Summer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size/scale</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Magnitude</td>
<td>Low Adverse</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>MINOR ADVERSE</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Feature Sensitivity</th>
<th>Vegetation</th>
<th>Description of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td><strong>Year 1 – Winter</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size/scale</td>
<td>Low</td>
<td>The trees within street pavement and rear gardens of 20-32 Worcester Avenue, and the tree in front of the Spurs Shop would be removed. These are relatively poor trees of limited public amenity value. The other existing trees are within parts of the site that will not change and are retained as part of the Project.</td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Magnitude</td>
<td>Low Beneficial</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>MINOR BENEFICIAL</td>
<td></td>
</tr>
<tr>
<td><strong>Year 15 - Summer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size/scale</td>
<td>Medium</td>
<td>The Project would notably increase the number of trees. This would provide a beneficial effect to the site and public urban realm. The proposed trees would be planted at a large enough size to make an immediate effect that would become more effective with time as the trees mature.</td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Magnitude</td>
<td>Medium Beneficial</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>MODERATE BENEFICIAL</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Feature Sensitivity</th>
<th>Free Standing Built Structure</th>
<th>Description of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td><strong>Year 1 – Winter</strong></td>
<td></td>
<td>The Project would result in the additional loss of the locally listed Victorian terraced buildings of 746, 748 and 750 High Road and the twentieth century terraced residential properties of 20-32 Worcester Avenue. These would be detrimental losses. Within Worcester Avenue this would result in the reduction in the remaining residential part of the street scene and replaced with a three storey commercial building (North Building). Whilst of different character to the remaining residential</td>
</tr>
<tr>
<td>Size/scale</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Magnitude</td>
<td>Low Beneficial</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>MINOR BENEFICIAL</td>
<td></td>
</tr>
<tr>
<td><strong>Year 15 - Summer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size/scale</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Magnitude</td>
<td>Low Beneficial</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>MINOR BENEFICIAL</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td></td>
</tr>
</tbody>
</table>

properties, the proposed North Building would provide enclosure and redefinition of the street frontage. This is considered a relative minor change to the built form within the site overall.

Whilst there is historical interest to 746, 748 and 750 High Road, the properties are visually in poor condition, providing a neglected appearance, with relatively limited value to the townscape. This is partly because of the current detached character of the properties as built forms and loss of identity in relation to the continuous frontage character of other parts of the street scene. Whilst there would be a detrimental loss, as buildings in the own right, the Project would retain Warmington House, and create a new three storey frontage to the High Road.

The removal of the existing Spurs Store and the creation of a new built frontage, would provide a beneficial change. The introduction of retail units, café and museum would revitalise the space around a new plaza on the High Road, creating an active frontage. The proposed use of cast iron panels and glazing would enable a sympathetic blending of the historic architecture with the modern predominantly aluminium and glazed frontages of the stadium and hotel.

The proposed stadium would create a building of large scale and massing, with a curved form, and cohesive and uniform appearance. The balanced mixture of glazing and cladding, with form and pattern varied on different elevations, and the use of varying degrees of perforation within the aluminium panels that express an outer skin would create a sense of lightness, free flowing shapes and animation to the elevations. This would also create visual interest and detailing that would help to reduce the awareness of the large extent of the building’s scale and mass.

The proposed hotel, extreme sports building and residential towers would constitute a major change to the built form, within the site and surroundings. These would introduce distinctive modern architectural buildings, which would define the site and form a catalyst for future urban regeneration within the locality. Within this context, this is considered a positive influence.
Whilst the presence of tall residential towers is becoming more evident within Tottenham within recently constructed and consented developments, the increase of the height of the proposed towers in the Southern Development is greater than currently exists in the locality. Despite the substantial increase in height and scale of buildings, the changes would provide buildings of high quality modern architecture and detailing, creating a positive attribute to the site. The buildings would become landmark features that evidently enhances the existing built quality in the site.

With the exception of the front walls of 20-32 Worcester Avenue, which would be removed as part of the Project, all the existing walls and railings would be retained.

The Project provides large open areas of public realm around the stadium to accommodate the flow of large numbers of fans on match days. The Project provides raised stepped areas of lawn, planting and water features on the southern part of the podium. These measures would help to improve microclimate conditions. The increased provision would have a beneficial effect on the site.

<table>
<thead>
<tr>
<th>Site Feature</th>
<th>Land Use</th>
<th>Description of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Year 1 – Winter</td>
<td>Size/scale</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Geograph.Inf.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Duration/Rev.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Magnitude</td>
<td>Medium Beneficial</td>
</tr>
<tr>
<td></td>
<td>Significance</td>
<td>MODERATE BENEFICIAL</td>
</tr>
<tr>
<td>Year 15 - Summer</td>
<td>Size/scale</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Geograph.Inf.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Duration/Rev.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Magnitude</td>
<td>Medium Beneficial</td>
</tr>
<tr>
<td></td>
<td>Significance</td>
<td>MODERATE BENEFICIAL</td>
</tr>
<tr>
<td>Site Feature Sensitivity</td>
<td>Public Access Medium</td>
<td>Description of Effect</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td><strong>Year 1 – Winter</strong></td>
<td></td>
<td>The Project would remove Paxton Road and associated public access. Public access would be retained along the other streets within the site. The public realm would be significantly increased, improving access within the site and more than offsetting the loss of Paxton Road. The changes would be particularly beneficial for pedestrians, through the greater restriction of vehicular access on Worcester Avenue. The proposed public realm provides more usable and enjoyable space for pedestrians and fans on match days, as well as for the local community and visitors on non-match days. The proposals would result in a greatly enhanced legibility and movement, as well as providing areas for sitting and resting. The use of varying tones of granite and Yorkstone as paving materials, would create high quality and durable finishes to the new and existing areas of public access.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Year 15 - Summer</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Occupation: Townscape Character**

12.5.5 Set out below are the effects on townscape character and are summarised in Appendix 12.6.

(Note: Yr = Year; Size = Size/Scale; Geo Inf = Geographical Influence; Dur/Rev = Duration/Reversibility; Mag = Magnitude; Sign = Significance)

<table>
<thead>
<tr>
<th>Townscape 1: THFC Stadium</th>
<th>Description of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sensitivity</strong></td>
<td></td>
</tr>
<tr>
<td>Very Low</td>
<td></td>
</tr>
<tr>
<td><strong>Year 1 – Winter</strong></td>
<td></td>
</tr>
<tr>
<td>Size/scale</td>
<td>Very High</td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>Very High</td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
</tr>
<tr>
<td>Magnitude</td>
<td>Very High Beneficial</td>
</tr>
<tr>
<td>Significance</td>
<td>MODERATE BENEFICIAL</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Significance | MODERATE BENEFICIAL
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**Year 15 - Summer**

<table>
<thead>
<tr>
<th>Size/scale</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geograph.Inf.</td>
<td>Very High</td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
</tr>
</tbody>
</table>

| Magnitude | Very High Beneficial |

| Significance | MODERATE BENEFICIAL |

The stadium would introduce a new building of substantial mass, articulated to provide a curving form, enabling improved access and circulation. The elevation utilises a mixture of materials, but would be predominantly characterised by the use of glazing and aluminium. The expansive arched glazed curtain wall of the south elevation would provide visual openness and lightness to the elevation. The glazing would also form an important element of the west elevation, continuing a sense of openness and lightness to the structure. This would be emphasised by the sense of movement and drama on match days at different levels. The north and east elevations provide a balanced mixture of glazing and cladding. The variably perforated aluminium vertical panel skin, would give visual interest and diversity, whilst providing a unifying appearance that wraps around the whole stadium. The articulation of the elevations with a mix of solid panels, voids and varying degrees of perforation, as well as openings for vents, would provide visual relief and interest that also relates to pattern of fenestration within the neighbouring existing buildings. The curved standing seam roof edge would create a solidity to define the top of the stadium, providing continuity.

The Project to the south of the stadium would introduce town houses along Park Lane that would provide a more appropriate townscape character and form comparison with the existing stadium by providing an active street frontage and a form and appearance that relates to the residential character of the street. The use of chamfered profile to the residential towers set above the townhouses, would enable an efficient use of space, enabling a greater depth of public realm. The residential towers provide a varied height and scale, but would be substantially larger than the adjoining residential buildings. Nevertheless, this would reflect the character of other residential towers present within the locality, and as demonstrated by the recently...
constructed Brook House at the former Cannon Rubber Factory. The vision for the design of the towers incorporates deep reliefs, balconies, garden roof terraces, a strong white masonry framework and balanced mixture of glazing and natural coloured terracotta panels. This would create strong architectural quality and detailing, providing an enhanced built quality and appearance to the townscape. The proposed extreme sports building would create a simple but distinctive form and articulation, which extends into the elevation treatments through the use contrasting tonal pre-cast concrete and glazing. This would provide a striking visual building offset between the proposed hotel and residential towers.

The proposed public realm, would create a greatly enhanced area of pedestrian access, not only beneficial to fans on match days, but also to the wider local community and visitors at other times. This would improve legibility and movement, as well as providing dynamic spaces at different levels. Large paved areas would provide for access and movement of large numbers of people on match days predominantly at the podium level. The areas of public realm would also be extended along the High Road and Park Lane, and through the creation of a shared surface along Worcester Avenue. Raised planters would define space, and in association with areas of banked steps, which would retain and direct movement. Water jets on the southern part of the podium would create an area of visual diversity and focus for activity. Tree planting would be provided within the raised beds, and form new street trees along Worcester Avenue, Park Lane and the High Road, providing an important contribution to the townscape, which is largely lacking within the Area. These measures would also improve the local microclimate. The use of different tones of granite and Yorkstone paving would provide a high quality treatment to the public realm that extends into the envelope of the proposed stadium.

Overall the Project would create a notable enhancement by providing a well-defined and
formed built character and public realm, utilising high quality architecture and materials. The design of the buildings creates a unity and consistency, whilst also providing visual diversity. The simplicity of form and shape provides complementary buildings, with well-proportioned and rhythmical detailing, whilst being sufficiently different to provide diversity and interest. The changes are seen as an important element in the proposed vision for the wider townscape regeneration that would extend the enhancements and improve the quality of the built character.

<table>
<thead>
<tr>
<th>Townscape</th>
<th>Description of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>2: Tottenham High Road</td>
<td>The Tottenham Experience and museum would create a new 3 storey built form that would introduce a distinctive new built material that uses cast iron panels to the facades. This approach would provide an association with the historic and contemporary use of metal as an elevation treatment to buildings. The treatment would be sympathetic, whilst also being clearly different to the historic built character of the retained Warmington House and other neighbouring buildings, enabling the existing historic buildings to be understood in the context of the new modern architecture.</td>
</tr>
</tbody>
</table>

The fragmented nature of the existing built form, building line and character to the south-west of the site would be removed, and Warmington House integrated to provide a more clearly defined built form that visually connects the historic character with the proposed modern architecture. The poor visual appearance of some of the gable ends of existing buildings, the ordinary appearance of the existing Spurs Store and the random variation of set backs along the building line, would be removed, and replaced with a clearly defined layout form and appearance, creating a more integrated built character that links the High Road to an extensive area of public realm, whilst also providing a continuity and visual containment to the street built...
frontage. The poor visual condition of Warmington House would be restored to its former historic appearance securing its future as an integral part of the streetscape.

Beyond the immediate context of the site within the TCA, the effects would dissipate with distance. Within this context, the changes would largely be experienced as occurring beyond and separate from the High Road street frontage, thereby retaining the existing continuity and integrity of the built line and facades, whilst introducing a new focal feature to the streetscape.

Within the immediate context of the site, the introduction of the proposed stadium and hotel, and the presence of the proposed Southern Development within the adjoining TCA 1, would significantly change the streetscape. The scale and mass would be much greater than the retained buildings along High Road. This would change the historical context of the street scene, in terms of the scale, form and appearance of the existing buildings that define its character. Nevertheless, the proposals would reflect the continually evolving character of the High Road, and whilst a major change, would create a significant new landmark feature along the High Road, defined by high quality architecture. The presence of THFC within Tottenham would more effectively engaged with the street scene of the High Road. The Project would create a major landmark feature and destination on the High Road that is currently lacking. The proposals also enable a more extensive area of public realm to be created along the High Road, within enhanced public access, movement and legibility, which extends into the adjoining parts of the site... The use of high quality paving materials, water features, raised planting beds, seating and additional new trees, would all enhance the character and appearance of this part of the TCA.

The proposals would create a major change to the TCA within the local context of the TCA, but much reduced beyond. On balance,
The beneficial influences would notably outweigh the adverse effects that both helps secure and further enhance the condition and appearance of the TCA, as well as regenerate the urban fabric.

<table>
<thead>
<tr>
<th>Townscape</th>
<th>3: North Tottenham Low Level Industrial Estates</th>
<th>Description of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>Very Low</td>
<td></td>
</tr>
<tr>
<td><strong>Year 1 – Winter</strong></td>
<td></td>
<td>The Tottenham Experience and museum would create a new 3 storey built form that would introduce a distinctive new built material that uses cast iron panels, giving a creative approach that provides an association with the historic and modern use of metal as an elevation treatment to buildings. The treatment would be sympathetic, whilst also being clearly different to the historic built character of Warmington House and other neighbouring buildings, enabling the existing buildings to be understood in the context of the new modern architecture. The fragmented nature of the existing built form, building line and character to the south-west of the site would be removed, and Warmington House integrated to provide a more clearly defined built form that visually connects the historic character with the proposed modern architecture. The poor visual appearance of some of the gable ends of existing buildings, the ordinary and limited definition of the existing Spurs Store and the random variation of set backs along the built line, would be removed, and replaced with a more clearly defined layout form and appearance, creating a more integral built character that links the High Road to a more extensive area of public realm, whilst providing a continuity and visual containment to the street built frontage. The poor visual condition of Warmington House would be greatly enhanced, restoring its former historic appearance and securing its future as an integral part of the streetscape. Beyond the immediate context of the site within the TCA, the effects would dissipate.</td>
</tr>
<tr>
<td></td>
<td>Geograph.Inf.</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Duration/Rev.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Magnitude</td>
<td>Medium Beneficial</td>
</tr>
<tr>
<td></td>
<td>Significance</td>
<td>MINOR BENEFICIAL</td>
</tr>
<tr>
<td><strong>Year 15 - Summer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Geograph.Inf.</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Duration/Rev.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Magnitude</td>
<td>Medium Beneficial</td>
</tr>
<tr>
<td></td>
<td>Significance</td>
<td>MINOR BENEFICIAL</td>
</tr>
</tbody>
</table>
with distance. Within this context, the changes would largely be experienced as occurring beyond and separate from the High Road street frontage, thereby retaining the existing continuity and integrity of the built line and facades, whilst introducing a new focal feature to the streetscape.

Within the immediate context of the site, the introduction of the stadium and hotel, and the presence of the buildings to the south of the stadium within the adjoining TCA 1, would significantly change the streetscape. The scale and mass would be much greater than the retained buildings along High Road. This would change the historical context of the street scene, in terms of the scale, form and appearance of the existing buildings that define its character. Nevertheless, the proposals would reflect the continually evolving character of the High Road, and whilst a major change, would create a significant new landmark feature within the High Road, defined by high quality architecture and use of materials, removing the existing hinterland character and enabling THFCs cultural presence within the community to be more evidently visually reflected and defined within the High Road. The Project would create a major landmark feature and destination on the High Road that is currently lacking. The proposals also enable a more extensive area of public realm to be created along the High Road, within enhanced public access, movement and legibility, which extends into the adjoining areas of land. The use of high quality paving materials, water features, raised planting beds, seating and additional new trees, would all enhance the character and appearance of this part of the TCA.

The proposals would create a major change to the TCA within the local context of the TCA, but much reduced beyond. On balance, the beneficial influences would notably outweigh the adverse effects that both helps secure and further enhance the condition and appearance of the TCA, as well as restore the strength of the urban fabric.
**Townscape 4: West Tottenham Large Scale Residential Description of Effect**

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Year 1 – Winter</th>
<th>Year 15 - Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geograph.Inf.</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Magnitude</td>
<td>High Beneficial</td>
<td>High Beneficial</td>
</tr>
<tr>
<td>Significance</td>
<td>MODERATE BENEFICIAL</td>
<td>MODERATE BENEFICIAL</td>
</tr>
</tbody>
</table>

The effect of the Project on TCA 4, would be experienced as a change occurring beyond the immediate boundary of the High Road, creating a substantial change within the immediate locality. This would be understood as being a change separate and removed from the TCA, but nevertheless influenced by the changing characteristics within an adjoining TCA. The changes would not conflict with the diverse range of built form, scales and character of the TCA.

The TCA has a disjointed and mixture of urban form and layout, relatively poor interconnectivity and aesthetically poor qualities of the built form. Despite the close proximity to the High Road, there is little visual relationship with it. Indeed the 'back of houses' appearance along Whitehall Street detracts from the character of the Area.

The Project would introduce buildings of very different, but well defined, coherent and unified form and appearance, whilst introducing aesthetic visual diversity in a coordinated manner that is lacking within the TCA. This would form a landmark feature and catalyst for further high quality townscape regeneration within the TCA.

**Townscape 5: West Tottenham Linear Residential Description of Effect**

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Year 1 – Winter</th>
<th>Year 15 - Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geograph.Inf.</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Magnitude</td>
<td>Medium Beneficial</td>
<td>Medium Beneficial</td>
</tr>
<tr>
<td>Significance</td>
<td>MODERATE BENEFICIAL</td>
<td>MODERATE BENEFICIAL</td>
</tr>
</tbody>
</table>

The relatively narrow built area located between the railway and the open space of Bruce Castle Park and Tottenham Cemetery, is characterised by a strong linear pattern of roads and two storey terraced and semi-detached housing, densely arranged, providing a strong sense of visual enclosure and visual unity, but with few distinctive features or landmarks. The extent of enclosure reduces the extent to which the TCA would be influenced by the Project. An awareness of change would predominantly occur where streets are aligned east to west.
where the proposed stadium and residential towers would be partially visible as a focal feature at the end of the street scene.

The TCA is separated from the site by the railway and TCA 2 and 4, and would be interpreted as a change occurring in a different part of the urban conurbation, creating a clearly different townscape character but unrelated and removed from TCA 5. The changes would be noticeable where visible, forming a new beneficial landmark feature, but throughout much of the TCA, the character would be unaffected.

<table>
<thead>
<tr>
<th>Townscape</th>
<th>Description of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>6: East Tottenham Mixed Linear Residential</td>
<td>The townscape character of the area is generally cohesive, defined by strong linear grid pattern, and continuity in built form with a high level of linear enclosure. This character would limit the awareness of change, due to the restrictive enclosure of the built form. The effect on the TCA would predominantly be restricted to the northern part of the TCA, particularly within the residential roads in close proximity to the Project and where aligned towards the Project. The changes would occur beyond the TCA boundary. The existing stadium in TCA 1 would be removed. The proposed residential elements of the Southern Development would reflect the predominantly residential character of the TCA, but the scale of the residential towers would noticeably contrast with the two storey houses in close proximity. This would have an adverse effect in close proximity, but would dissipate with distance, with the perception of scale becoming more in balance with the existing streetscape. For much of the TCA, the integral character of the unified streetscape would be retained, with the awareness of a more distant change within the urban conurbation. The appearance of the residential towers would provide a high quality built form and detailing. On balance the changes are considered</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 – Winter</td>
<td>Size/scale</td>
</tr>
<tr>
<td></td>
<td>Geograph.Inf.</td>
</tr>
<tr>
<td></td>
<td>Duration/Rev.</td>
</tr>
<tr>
<td></td>
<td>Magnitude</td>
</tr>
<tr>
<td></td>
<td>Significance</td>
</tr>
<tr>
<td>Year 15 - Summer</td>
<td>Size/scale</td>
</tr>
<tr>
<td></td>
<td>Geograph.Inf.</td>
</tr>
<tr>
<td></td>
<td>Duration/Rev.</td>
</tr>
<tr>
<td></td>
<td>Magnitude</td>
</tr>
<tr>
<td></td>
<td>Significance</td>
</tr>
</tbody>
</table>
### Townscape Sensitivity

**Townscape Sensitivity**

<table>
<thead>
<tr>
<th>Year 1 – Winter</th>
<th>Size/scale</th>
<th>Geograph.Inf.</th>
<th>Duration/Rev.</th>
<th>Magnitude</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northumberland Park</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Medium Beneficial</td>
<td>MINOR BENEFICIAL</td>
</tr>
</tbody>
</table>

**Description of Effect**

The urban form of the TCA is depicted by an erratic and inconsistent layout, with piece-meal infill development, and discordant mixture of built scales, creating a poorly defined character.

In an Area that is defined by a varied and mixed built form and character, the introduction of the new built features just beyond the boundary of TCA 7, would not conflict with its character and would be beneficial by introducing a higher quality of architectural form and detailing.

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<table>
<thead>
<tr>
<th>Year 15 - Summer</th>
<th>Size/scale</th>
<th>Geograph.Inf.</th>
<th>Duration/Rev.</th>
<th>Magnitude</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruce Castle Mixed Open Space</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Medium Beneficial</td>
<td>MINOR BENEFICIAL</td>
</tr>
</tbody>
</table>

**Description of Effect**

Much of the TCA has a well treed character, with large numbers of mature trees that provide a strong and contrasting green open space character within a dense urban setting. The surrounding built form also creates enclosure, even in winter, generally limiting awareness of change to the peripheral boundaries of the TCA.

The Project would introduces changes within a TCA separated by TCA 2, 4 and 5. However, the changes are sufficiently large in scale and massing, that they would adversely affect the TCA by increasing the awareness of the surrounding urban setting, and introducing buildings of much larger scale than the buildings surrounding the TCA. This effect would be limited in geographical influence, mainly being restricted to the northern part of the Bruce Castle Park, with much of the TCA being largely unaffected.

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<table>
<thead>
<tr>
<th>Year 1 – Winter</th>
<th>Size/scale</th>
<th>Geograph.Inf.</th>
<th>Duration/Rev.</th>
<th>Magnitude</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee Valley Large Scale Industrial</td>
<td>Very Low</td>
<td>Low</td>
<td>High</td>
<td>Very Low Beneficial</td>
<td></td>
</tr>
</tbody>
</table>

**Description of Effect**

The TCA is composed of large scale utilitarian industrial units following a linear pattern which shape the visual character of
**Significance**

<table>
<thead>
<tr>
<th>Year 15 - Summer</th>
<th>Size/scale</th>
<th>Very Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geograph.Inf.</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Magnitude</td>
<td>Very Low Beneficial</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>NEGLIGIBLE BENEFICIAL</td>
<td></td>
</tr>
</tbody>
</table>

The area. There is consequently little influence from adjoining areas of townscape character, except along its boundaries or as visual elements beyond the end of streets. The Project would consequently have very little effect on the TCA, and where evident would be experienced as an unrelated and distant change, introducing a feature of interest within the wider urban conurbation.

**Townscape Sensitivity**

<table>
<thead>
<tr>
<th>Year 1 – Winter</th>
<th>Size/scale</th>
<th>Very Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geograph.Inf.</td>
<td>Very Low</td>
<td></td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Magnitude</td>
<td>Very Low Beneficial</td>
<td></td>
</tr>
<tr>
<td>Significance</td>
<td>NEGLIGIBLE BENEFICIAL</td>
<td></td>
</tr>
</tbody>
</table>

The character of the TCA illustrates a discordant nature with inconsistent layout and limited interconnectivity, poor legibility and a built form that is typically defined by large scale and massed buildings. The Project would have very limited effect on the TCA, due to the containing nature of the existing built form and the extent of distance and separation. Where visible the change would be experienced as a distant new feature and character, unrelated to the TCA, but consistent with its presence in a large urban conurbation, with a varied townscape that incorporates similar large scale buildings.

**Occupation: Views**

12.5.6 The tables below set out the effects on the representative viewpoints and is summarised in Appendix 12.6 (refer to Figures 12.1, 12.2 and 12.3 for Viewpoint locations). Appendix 12.5 illustrates the view from each viewpoint, with some prepared as photorealistic AVRs that visually demonstrate how the view will change, and some prepared as wireline AVRs. The latter provides an outline of the total building mass of the Project as a red line, to assist in understanding where the proposed buildings would be located within the view and their extent. An additional blue line is provided to provide a comparison with the consented development. Where the Southern Development is illustrated by a photorealistic AVR, these accord with the Parameter Plans and Design Code. It should also be understood that the images have been prepared as a single frame photograph, capturing one part of typically much wider extent of view. It is therefore important that images are also viewed in the location the photographs were taken, to appreciate the correct scale of the proposals and understand the change in the wider context of the view. The assessed effects, sometimes refer to other features within the wider context that are not visible within images provided in Appendix 12.5, but are relevant to how the Project would relate to the features within the wider view. Additionally, the assessed geographical influence of the Project on the view is based on the view experienced from the viewpoint location, incorporating a wider view where this is available.
(Note: Size = Size/Scale; Geo Inf = Geographical Influence; Dur/Rev = Duration/Reversibility; Mag = Magnitude; Sign = Significance)

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
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</tr>
<tr>
<td><strong>Year 1 – Winter</strong></td>
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</tr>
<tr>
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<tr>
<td>Magnitude</td>
<td>Medium Beneficial</td>
</tr>
<tr>
<td>Significance</td>
<td>MODERATE BENEFICIAL</td>
</tr>
<tr>
<td>Description of Effect</td>
<td>The Project would form a noticeable change to the view, with the relatively larger massing of the proposed stadium forming a more clearly discernible feature in the view, in comparison to the existing stadium. The proposed hotel and residential towers would create visually strong new vertical forms within the broader urban setting. The most noticeable aspect being the top of the proposed hotel and Tower C breaking the skyline. The form and massing of the proposed buildings would not be disproportionate to the scale of the urban context and the extent occupied within the view. Due to the presence of other rectilinear buildings closer to the viewer, the effect of perspective gives the perception of a similar scale of massing and occupation of the view. Other existing residential towers within the view provides the awareness that this a characteristic feature of the view. The greater height and massing of the proposed hotel and residential towers, draws the attention of the viewer to this part of the view. This would create a landmark feature, in part of panorama that lacks a positive distinctive urban feature. The most noticeable existing feature within the view is the London Waste Ecopark Incinerator, which forms a detractive and intrusive feature. The Project would become the most distinctive feature, drawing visual attention away from the incinerator. The proposals would provide a high quality development in terms or architectural design and use of materials. The introduction of the Project as a landmark feature into the view would visually reflect the status and importance of THFC within this part of Greater London. The Project would become a clearly identifiable new feature within a part of a very</td>
</tr>
<tr>
<td><strong>Year 15 - Summer</strong></td>
<td></td>
</tr>
<tr>
<td>Size/scale</td>
<td>Medium</td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>Low</td>
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<tr>
<td>Duration/Rev.</td>
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<td>Magnitude</td>
<td>Medium Beneficial</td>
</tr>
<tr>
<td>Significance</td>
<td>MODERATE BENEFICIAL</td>
</tr>
</tbody>
</table>
extensive panoramic view from Alexandra Palace that extends well beyond that shown within the AVR of the Viewpoint. The Project would be seen within the context of other urban landmark features within the wider panorama, which add to the visual interest and character of the view.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Sensitivity</th>
<th>Description of Effect</th>
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<tbody>
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<td>Year 1 – Winter</td>
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<td>Year 15 - Summer</td>
<td>Size/scale</td>
<td>No Change</td>
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<tr>
<td>Year 15 - Summer</td>
<td>Geograph.Inf.</td>
<td>No Change</td>
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</tr>
<tr>
<td>Year 15 - Summer</td>
<td>Size/scale</td>
<td>No Change</td>
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<tr>
<td>Year 15 - Summer</td>
<td>Geograph.Inf.</td>
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<td>Year 15 - Summer</td>
<td>Magnitude</td>
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<tr>
<td>Year 15 - Summer</td>
<td>Significance</td>
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### Viewpoint Sensitivity

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<td>High</td>
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<tr>
<td>Magnitude</td>
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</tr>
<tr>
<td>Significance</td>
<td>MODERATE NEUTRAL</td>
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</tbody>
</table>

**Description of Effect**
The stadium would not be visible within the view. All four proposed residential towers would be clearly visible on the skyline above the roofline of the neighbouring two storey houses. This would be experienced in the wider context of the Broadwater Farm’s mid and high rise residential towers. The effect of distance, results in the buildings to the south of the stadium appearing as small scaled buildings in comparison to that of the Broadwater Farm Community Centre and residential towers, occupying a much smaller proportion of the view. Within the context of other high rise residential blocks, the change to the view would not be unexpected, forming a similar characteristic visual feature. The principles set out in the Design Code for the outline elements of the application, indicate the Project would lead to the introduction of higher quality built form within the view than currently characterised by the Broadwater Farm estate. However, given the distance of the Project from the viewer, the architectural detailing would be less influential on the view and therefore would create a neutral effect.

<table>
<thead>
<tr>
<th>Year 15 - Summer</th>
<th>6</th>
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</thead>
<tbody>
<tr>
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<td>Magnitude</td>
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</tr>
<tr>
<td>Significance</td>
<td>MODERATE NEUTRAL</td>
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</tbody>
</table>

**Description of Effect**
The Project would have no effect on views in summer, where vegetation in the foreground would provide an effective screen. In winter, filtered views of the Project would be evident through vegetation. The top of the stadium would be visible just above the embankment in the foreground, with the residential towers forming a discernible new feature. This would form a small change to the view, with most road users having limited awareness of the change to the view. The Project would occupy a small proportion of the view and smaller visual massing in comparison to other industrial units along the River Lee, and much lower in height than the overhead powerlines and pylon towers, that are both visible within the wider view from the Forest Lane Bridge. Whilst of a higher quality built...
development to the industrial units, this would be difficult to determine due to distance and the influence of intervening vegetation and therefore on balance, this is considered a neutral effect on the view.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>7</th>
</tr>
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<tbody>
<tr>
<td>Sensitivity</td>
<td>High</td>
</tr>
</tbody>
</table>

**Year 1 – Winter**

| Size/scale | Medium |
| Geograph.Inf. | Medium |
| Duration/Rev. | High |
| Magnitude | Medium Neutral |
| Significance | MODERATE NEUTRAL |

The top of the proposed stadium would be visible above the vegetation along the railway in the foreground as filtered views through the vegetation in winter. The proposed hotel, extreme sports building and residential towers would be clearly visible, forming a noticeable and conspicuous new feature above the existing vegetation and against the skyline. This would be experienced within the context of other tall structures, most notably the large mast seen in same visual context and other built features within the wider context of the view. This includes the residential towers of Brook House, Stella House, the closer Kenneth Robbins House, and the tall chimney stacks within the railway sidings and the low profiled but large massing of the Northumberland Park Depot industrial units. The Project would not be visually disproportionate to these existing built features and structures within the view. The form, architectural detailing and materials would be a discernible aspect that would influence the view, most notably the residential towers. The use of chamfered profiles, deep reveals, balance of glazing and solidity of masonry frame and natural coloured terracotta cladding, and garden rooftop terraces, would provide a higher quality built form to most of the other buildings within the view, providing a beneficial influence. However, on balance, the change is considered a neutral effect on the view.

| Size/scale | Medium |
| Geograph.Inf. | Medium |
| Duration/Rev. | High |
| Magnitude | Medium Neutral |
| Significance | MODERATE NEUTRAL |

**Year 15 - Summer**

The form, architectural detailing and materials would be a discernible aspect that would influence the view, most notably the residential towers. The use of chamfered profiles, deep reveals, balance of glazing and solidity of masonry frame and natural coloured terracotta cladding, and garden rooftop terraces, would provide a higher quality built form to most of the other buildings within the view, providing a beneficial influence. However, on balance, the change is considered a neutral effect on the view.
<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Sensitivity</th>
<th>Description of Effect</th>
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</thead>
<tbody>
<tr>
<td>Year 1 – Winter</td>
<td>Low</td>
<td>The proposed stadium would not be visible within the view. The existing stadium at the centre of the view would be replaced in the view, primarily by the proposed residential towers. Most noticeably Tower C would form a prominent new feature, with Tower A being screened in summer and only filtered views through the existing street trees in winter. The proposed residential towers would be seen at the end of the street scene forming a new focal feature of enhanced architectural quality to the existing stadium, but substantially taller, both in comparison to the existing stadium and the domestic scale of the terraced houses to the left of the street. The buildings to the south of the stadium would be visually proportionate and occupy a similar extent of the view to that of the residential blocks to the right of the view, due to the influence of perspective and distance. The Project would create a more defined residential focal element, providing a new landmark feature at the centre of the view. The design and detailing of the buildings to the south of the stadium would form an important aspect of the change to the view. The residential towers would provide well proportioned, harmonious and coherent built elevations, with a strong vertical rhythm of solids and voids. The use of deep reveals, garden roof terraces, balconies and balance of glazing, masonry and natural terracotta panels would provide a high quality built character. This would be of higher architectural quality to the existing residential blocks along Park Lane. Due to the prominence of the residential towers, this would provide an important influence on other future built development and planned urban regeneration. The increase in height and massing would be balanced against the introduction of a high quality landmark feature, creating a neutral effect.</td>
</tr>
<tr>
<td>Year 15 - Summer</td>
<td>Low</td>
<td>The proposed stadium would not be visible within the view. The existing stadium at the centre of the view would be replaced in the view, primarily by the proposed residential towers. Most noticeably Tower C would form a prominent new feature, with Tower A being screened in summer and only filtered views through the existing street trees in winter. The proposed residential towers would be seen at the end of the street scene forming a new focal feature of enhanced architectural quality to the existing stadium, but substantially taller, both in comparison to the existing stadium and the domestic scale of the terraced houses to the left of the street. The buildings to the south of the stadium would be visually proportionate and occupy a similar extent of the view to that of the residential blocks to the right of the view, due to the influence of perspective and distance. The Project would create a more defined residential focal element, providing a new landmark feature at the centre of the view. The design and detailing of the buildings to the south of the stadium would form an important aspect of the change to the view. The residential towers would provide well proportioned, harmonious and coherent built elevations, with a strong vertical rhythm of solids and voids. The use of deep reveals, garden roof terraces, balconies and balance of glazing, masonry and natural terracotta panels would provide a high quality built character. This would be of higher architectural quality to the existing residential blocks along Park Lane. Due to the prominence of the residential towers, this would provide an important influence on other future built development and planned urban regeneration. The increase in height and massing would be balanced against the introduction of a high quality landmark feature, creating a neutral effect.</td>
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### Viewpoint of Effect

<table>
<thead>
<tr>
<th>Year 1 – Winter</th>
<th>Size/scale</th>
<th>Geograph.Inf.</th>
<th>Duration/Rev.</th>
<th>Magnitude</th>
<th>Significance</th>
<th>Description of Effect</th>
</tr>
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<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low Neutral</td>
<td>MINOR NEUTRAL</td>
<td>The construction of the building in the mid-distance occupies the centre of the view and street scene, and combined with the other existing buildings within Fore Street, would screen most of the Project. Only the very top of the proposed hotel, part of the top of the proposed stadium and the top of Tower C would be discernible as a change to the view. This would visually coalesce with the existing massing of the built form within the street scene. Variations in the massing of the built elevations and the use of an outer aluminium screen cladding within the proposed stadium and hotel would form a discernible aspect, but would have little influence on the view and the built character of the street scene. The Project would introduce small elements of new built character that would be consistent with the existing mixed character already present within the view. Accordingly the change to the view would be a neutral effect.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 15 - Summer</th>
<th>Size/scale</th>
<th>Geograph.Inf.</th>
<th>Duration/Rev.</th>
<th>Magnitude</th>
<th>Significance</th>
<th>Description of Effect</th>
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<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low Neutral</td>
<td>MINOR NEUTRAL</td>
<td>The extent and density of the intervening vegetation would largely screen the Project in winter and almost entirely screen in summer. The proposed hotel and residential towers would be a barely discernible new feature, visible as a very filtered view through the existing trees. The change would introduce built development on the skyline, in a part of the view where there is currently no built development, and therefore would form an adverse effect.</td>
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<tr>
<td>Viewpoint Sensitivity</td>
<td>11</td>
<td>Description of Effect</td>
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<tr>
<td><strong>Year 1 – Winter</strong></td>
<td></td>
<td>The upper part of the stadium would be visible above the roofline of the existing buildings in the fore and mid ground in winter, viewed as filtered views through the existing trees. The density of the branch structure of the existing trees is sufficient to provide an effective reduction in the visual awareness of a change to the view. In summer, the mature park trees would screen the proposed stadium. The most noticeable change would be the introduction of the proposed hotel, part of the extreme sports building and residential towers, with parts of Tower C being seen above and to the side of the hotel. Whilst this would be partially screened by the existing park trees, much of the proposed buildings would be clearly visible set against the skyline. The height and massing of the proposed buildings would be clearly taller and larger than the adjoining buildings within the view and occupy a part of the skyline that is not reflected by other buildings within the view. However, the changes would be proportional to the existing trees within the view and would not dominate within the view. The trees would remain as the key features and the treed nature of the park would be retained as the prominent character of the view. The glazed cladding and perforated aluminium screen elevation to the proposed hotel and the deep reveals and upper garden roof terraces would form a distinctive and high quality built character. Whilst introducing a positive built character to the view, it would be evidently different to the existing built character. In summer, whilst the proposed buildings would be partly screened by the existing trees, the change would be more apparent, as most of the existing buildings would also be screened by the trees. Consequently, the proposed hotel and residential towers would become the most evident built feature within the view. The</td>
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<td><strong>Year 15 - Summer</strong></td>
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change to the view in the context of the historic park is assessed as an adverse change.

<table>
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<tr>
<td><strong>Description of Effect</strong></td>
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</tr>
<tr>
<td><strong>Year 1 – Winter</strong></td>
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<tr>
<td>Size/scale</td>
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<td>Magnitude</td>
<td>Very Low Adverse</td>
</tr>
<tr>
<td>Significance</td>
<td>MINOR ADVERSE</td>
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<tr>
<td><strong>Year 15 - Summer</strong></td>
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<tr>
<td>Size/scale</td>
<td>Very Low</td>
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<tr>
<td>Geograph.Inf.</td>
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<td>Duration/Rev.</td>
<td>High</td>
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<tr>
<td>Magnitude</td>
<td>Very Low Adverse</td>
</tr>
<tr>
<td>Significance</td>
<td>MINOR ADVERSE</td>
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</table>

The existing park trees within the foreground and mid-distance would create a multi-layered screening effect, providing a complete screen for the Project in summer and a dense screen in winter. The proposed hotel and residential towers would be barely discernible as new features through the dense screening effect of the trees in winter. There are no buildings of similar character and proportionate massing within the view, so the effect would be an adverse change.

<table>
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<tr>
<th>Viewpoint</th>
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<tbody>
<tr>
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<td><strong>Description of Effect</strong></td>
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<td>Significance</td>
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<td><strong>Year 15 - Summer</strong></td>
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<td>Size/scale</td>
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<td>Magnitude</td>
<td>Low Beneficial</td>
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<td>Significance</td>
<td>MINOR BENEFICIAL</td>
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</table>

The stadium would form a new distant focal feature at the centre of the view. This would replace the existing view of residential tower of Stella House, which would be located behind the stadium. The stadium would appear as being approximately the same height as Stella House, but occupying a slightly larger proportion of the view, set against the skyline. The proposed hotel would relate more to the existing building line to the right of the view, and form an apparent new feature within the view, partially screened by the existing street trees within the view. The residential towers would not be visible in summer and only glimpsed as very filtered views through the existing trees in winter.

The stadium and hotel would become sufficiently evident within the view that it would define the presence of the stadium as a landmark for fans and visitors arriving from Seven Sisters, whilst not overwhelming and retaining the broad character of the street scene. The proposals Project would be experienced as a change to the view, occurring beyond and separate from the main street thoroughfare in the fore and mid
ground, whilst still being experienced as a balanced integral element of the street. The Project would form an enhanced focal feature for the street scene, without adversely affecting the character of the closer street scene, and therefore would be a beneficial change.

<table>
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<tr>
<th>Viewpoint</th>
<th>14</th>
<th>Description of Effect</th>
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<tbody>
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<td>Year 1 – Winter</td>
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<tr>
<td>Significance</td>
<td>MODERATE NEUTRAL</td>
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</table>
| | | Much of the Project would be partially screened in winter and fully screened in summer by the neighbouring buildings and trees in the foreground. The density of branch structure of the existing trees is sufficiently effective to diffuse the visual awareness of change to the view. Whilst this would be a discernible change, it would not adversely affect the broader treed character of the park.

The main influence on the view would be the presence of Tower C, which would be clearly visible on the skyline, forming a taller built feature than the other neighbouring buildings surrounding the park. The residential tower would not be disproportionate in size and scale to the existing trees within the view, forming a subsidiary visual feature. The trees would remain as the key feature and characteristic of the park and the associated view. The changes to the view would occupy a relatively small part of a much wider park view.

The residential towers, would introduce a higher architectural quality to the existing buildings within the view, although the proposed vernacular would be less evident, being experienced as a clearly more distant aspect of the view. On balance the change is considered neutral.

<table>
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<th>Viewpoint</th>
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<tbody>
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<tr>
<td>Year 1 – Winter</td>
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<td>Size/scale</td>
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<td>Magnitude</td>
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</table>
| | | The stadium would form a new focal feature at the centre of the view. This would replace the existing partial view of residential tower of
<table>
<thead>
<tr>
<th>Year 15 - Summer</th>
<th>Size/scale</th>
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<td>Geograph.Inf.</td>
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<td>Duration/Rev.</td>
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<tr>
<td>Magnitude</td>
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</table>

Stella House (more apparent in winter), which would be located behind the stadium. The stadium and hotel would be evidently taller features, appearing above the roofline of the existing buildings in the mid-distant street scene. However, the changes would not be disproportionate to the overall massing of buildings within the view or disproportionately occupy the view. Much of the stadium and hotel, would be screened by the existing buildings and the existing street trees. The trees would provide a partial screen in winter and more effective screen in summer.

The extreme sports building and residential towers would largely be screened by the existing buildings within the view, with only the very tops being visible above the roofline, and consequently would have very little influence on the view.

The combination of glazed cladding and perforated aluminium screen used within the elevations of the proposed stadium and hotel, would create a modern distinctive appearance that would be clearly different to the existing built character. This would help to emphasise that the change is occurring within a separate part of the street scene, marking the presence of the stadium and hotel, whilst retaining the visual integrity of the existing High Road. The Project would be experienced as a change to the view, occurring beyond and separate from the main street thoroughfare in the fore and mid ground, whilst still being experienced as a balanced integral element of the street.

The stadium and hotel would become sufficiently evident within the view that it would define the presence of the stadium as a landmark for fans and visitors arriving from the south, whilst not overwhelming and retaining the broad character of the street scene. The stadium and hotel would form an enhanced focal feature for the street scene, without adversely affecting the broader visual integrity, and therefore would be a beneficial change.
## Viewpoint Description of Effect

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Sensitivity</th>
<th>Size/scale</th>
<th>Geograph.Inf.</th>
<th>Duration/Rev.</th>
<th>Magnitude</th>
<th>Significance</th>
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<tbody>
<tr>
<td><strong>Year 1 – Winter</strong></td>
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<td>Medium</td>
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<td>High</td>
<td>High</td>
<td>High Neutral</td>
<td>MODERATE NEUTRAL</td>
</tr>
</tbody>
</table>

The stadium would form a prominent new feature within the view, with only the very top of residential Tower C and the proposed hotel being visible just above the proposed stadium. Most of the existing buildings within and adjacent to the site would be retained within the view i.e. Paddy Power bookmakers through to Dial House. The integrity of these buildings would consequently be retained as a continuous built form. The proposed stadium would appear as a prominent new feature above the roofline of these buildings.

The form and appearance of the stadium would be evidently different to the existing buildings. This would create a contrasting character that would be clearly discernible and separate from the existing historic built character of the High Road. The use of vertical panel elements, with glazing and proportioned mixed perforated aluminium screen panels, echoes the fenestration of the existing building. This helps to reflect and relate the proposed stadium to the existing street scene, whilst still clearly providing a new identity and presence.

The change would enable the stadium and THFC to provide a stronger visual presence within the High Road and create a clearly defined visual centre that more closely reflects the role of the Club in the community. This would also reflect the broader vision of providing a catalyst for much of the planned wider urban regeneration, whilst retaining the more valued local visual features. The changes to the view would provide a mixture of adverse and beneficial influences, which on balance are considered to create a neutral effect.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Sensitivity</th>
<th>Size/scale</th>
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<th>Duration/Rev.</th>
<th>Magnitude</th>
<th>Significance</th>
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<tbody>
<tr>
<td><strong>Year 15 - Summer</strong></td>
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<td>High</td>
<td>High</td>
<td>High</td>
<td>High Neutral</td>
<td>MODERATE NEUTRAL</td>
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</tbody>
</table>

The existing buildings visible within the view would be retained, other than the existing stadium and the residential properties set
back to the western side of Worcester Avenue (the roofline of two of the houses is visible above the existing tree within the view). The existing residential character of Worcester Avenue is already noticeably affected by the existing stadium. This would be removed and replaced with a stadium of much larger form and massing, and consequential presence within the view. This would be set above the roofline of the existing houses.

The form and appearance of the stadium would be evidently different in character, further reinforcing the separation between the stadium and residential part of the street. The use of glazing and a regular pattern of perforated aluminium screen panels, echoes the fenestration of the existing buildings within the view, whilst also providing greater coherence and consistency in the built character of the stadium. This use of these materials would also give a visual lightness to the building mass set against the skyline.

The north building and residential towers, complement the appearance of the proposed stadium, whilst also contrasting with the curved solidity of the stadium massing. The tiered nature of the built shape and the use of chamfered forms to the top of the residential towers and the incorporation of deep reliefs and garden roof terraces, create visual interest, whilst also helping to ‘root’ the proposed stadium within the street scene.

The stadium would provide an enhanced appearance in comparison to the existing stadium. The architecture and use of materials would be clearly different to the retained existing buildings, but would not be unexpected within street scenes that have experienced extensive modification and change in the past. The proposed buildings would introduce a high quality architecture and use of materials. This would reflect the broader objectives for change envisaged through the further planned urban regeneration within Northumberland Park.

When considered in the broader context of the view, the Project would form a very
prominent change to the view, without dominating or being overwhelming, whilst also introducing a well defined and new high quality architecture within a modified street scene. On balance this considered a neutral change to the view.

<table>
<thead>
<tr>
<th>Viewpoint</th>
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<tbody>
<tr>
<td>Sensitivity</td>
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<tr>
<td>Description of Effect</td>
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<td><strong>Year 1 – Winter</strong></td>
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<td>Duration/Rev.</td>
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<td>Magnitude</td>
<td>High Beneficial</td>
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<tr>
<td>Significance</td>
<td>MODERATE BENEFICIAL</td>
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</table>

The stadium, residential towers and top of the hotel would form prominent new features set against the skyline. This existing stadium would be demolished, removing the substantial metal roof gantries from the view. The proposed buildings would be seen above and beyond the existing Northumberland Park Community School, which provides a low profile but expansive built massing in the foreground of the view. The tall residential block of Trulock Court, within the immediate foreground, would remain as the most dominant feature within the view. The proposed residential towers would reflect form of Trulock Court.

The view currently lacks a defined built character, with a mixed and poorly formed urban fabric and street scene. This reflects the modified and varied nature of land use within this part of the local setting. The Project would introduce buildings of high quality, enhanced architecture, with distinctive use of building materials. This would improve quality of the urban fabric within the view and reflect the broader objectives of providing a catalyst and vision for the future planned urban regeneration within Northumberland Park. This would have a beneficial effect on the view.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>19</th>
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<tbody>
<tr>
<td>Sensitivity</td>
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<td>Description of Effect</td>
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<tr>
<td><strong>Year 1 – Winter</strong></td>
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<tr>
<td>Size/scale</td>
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<td>Significance</td>
<td>MODERATE BENEFICIAL</td>
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</table>

The existing stadium, at the end of the street scene, would be removed and replaced with a proposed stadium of clearly taller and larger massing. This would form a prominent new feature at the centre of the view, whilst
The residential towers would form a prominent new feature on the skyline, above the rooftop of the existing terraced houses. This would be experienced as a change separate from and beyond the immediate street scene, with the visual continuity of the existing built line and form being retained within the view. Whilst clearly different, the strong vertical rhythm of solids and voids, deep reliefs, and balanced mixture of glazing, white masonry frame and natural coloured terracotta cladding panels, would reflect the continuity, form and harmony of the existing built form within the view. The use of deep reliefs, balconies and garden roof terraces would also add visual interest to the view, relating to the varied vernacular of the existing terraced houses.

The changes would introduce a clearly different character, but one that nevertheless relates well to the existing built setting, providing high quality buildings that would form the catalyst and basis for the future planned urban regeneration in Northumberland Park and therefore a beneficial effect.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Description of Effect</th>
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<tbody>
<tr>
<td>Year 1 – Winter</td>
<td>The stadium, hotel and extreme sports building would not be visible within the view.</td>
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<tr>
<td>Size/scale</td>
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<tr>
<td>Geograph.Inf.</td>
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<td>Duration/Rev.</td>
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<tr>
<td>Significance</td>
<td>MODERATE NEUTRAL</td>
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</table>

| Year 15 – Summer |                                                                                         |
| Size/scale       | High                                                                                   |
| Geograph.Inf.    | High                                                                                   |
| Duration/Rev.    | High                                                                                   |
| Magnitude        | High Neutral                                                                            |

remaining proportionate to the overall built massing within the street scene. The southern single glazed façade would be an evident feature, providing a visual lightness to the structure. The verticality and scale of the varied perforated aluminium panels on the remaining visible elevation, would create visual coherence and relate to the fenestration within the existing buildings.

The residential towers would form a prominent new feature on the skyline, above the rooftop of the existing terraced houses. This would be experienced as a change separate from and beyond the immediate street scene, with the visual continuity of the existing built line and form being retained within the view. Whilst clearly different, the strong vertical rhythm of solids and voids, deep reliefs, and balanced mixture of glazing, white masonry frame and natural coloured terracotta cladding panels, would reflect the continuity, form and harmony of the existing built form within the view. The use of deep reliefs, balconies and garden roof terraces would also add visual interest to the view, relating to the varied vernacular of the existing terraced houses.

The changes would introduce a clearly different character, but one that nevertheless relates well to the existing built setting, providing high quality buildings that would form the catalyst and basis for the future planned urban regeneration in Northumberland Park and therefore a beneficial effect.
Significance | MODERATE NEUTRAL  
---|---
and a partial filtered screen in winter.

The buildings to the south of the stadium would reflect the residential character of the street scene, and would be seen in the same visual context as the existing three and four storey residential blocks to the right of the view. The existing trees would also help to integrate harmoniously the new buildings into the existing built character.

The design and detailing of the buildings to the south of the stadium would form an important aspect of the change to the view. The residential towers would provide well proportioned, harmonious and coherent built elevations, with a strong vertical rhythm of solids and voids. The use of deep reveals, garden roof terraces, balconies and balance of glazing, masonry and terracotta panels would provide a high quality built character. This would be of higher architectural quality to the existing residential blocks along Park Lane and provide a new focal feature within the view. Due to the prominence of the residential towers, this would be an important influence on other future built development and planned urban regeneration within Northumberland Park. The increased prominence of the built form within the view would be balanced against the introduction of a higher quality of built character and visual interest within the view, resulting a neutral effect on the view.

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<tr>
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<tr>
<td><strong>Significance</strong></td>
<td><strong>MODERATE NEUTRAL</strong></td>
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<tr>
<td><strong>Year 1 – Winter</strong></td>
<td></td>
<td>The Project would remove the existing stadium, with its large massed solidity and relatively austere appearance with limited vernacular treatment or detailing. This would be replaced with buildings of more varied form, massing, articulated design and high quality detailing.</td>
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<tr>
<td>Size/scale</td>
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<tr>
<td>Geograph.Inf.</td>
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<tr>
<td>Magnitude</td>
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<tr>
<td>Significance</td>
<td>SUBSTANTIAL BENEFICIAL</td>
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</tr>
<tr>
<td><strong>Year 15 – Summer</strong></td>
<td></td>
<td>The proposed changes would be predominantly defined by the buildings to the south of the stadium. The residential towers would introduce a substantial new feature into the view, much taller than the existing</td>
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<tr>
<td>Size/scale</td>
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<td>Magnitude</td>
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<tr>
<td>Significance</td>
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</tbody>
</table>
stadium, but providing a residential character at street level and an enhanced building of greater visual interest and aesthetic appearance. In close proximity, the viewer’s focus of attention would be at street level and similar to that illustrated within the AVR. Whilst there would be a peripheral awareness of a greater height, the effect of the taller parts of the towers would be relatively limited due to the effects of perspective.

The design of the residential towers would create a vertical rhythm of solids and voids with deep reliefs, balconies, defined by a visually strong white masonry framework, and composed of a balanced contrast of glazing and terracotta panels. This would create a building of harmonious and coherent pattern and proportions, will providing visual interest and diversity.

The existing poor definition, visual clutter and aesthetic appearance of the public realm, would be replaced with an enhanced public realm. The Project would, remove bollards and kerbs along Worcester Avenue and the poor quality paving and trees of average form. The public realm would be enhanced by a shared pedestrian and vehicular surface with new high quality paved surfaces and new tree planting along Park Lane and Worcester Avenue.

The proposed changes would be substantial but would enhance the appearance of the street scene in terms of the quality and appearance of the buildings, public realm and urban fabric. This would provide an important aspect within the future planned urban regeneration for Northumberland Park.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>22</th>
<th>Description of Effect</th>
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</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>High</td>
<td>The harsh industrial elevation of the existing southern stand, with metal gantry roofs would be removed from the view. The existing stadium relates poorly to the residential character of the street scene and would be</td>
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<tr>
<td>Year 1 – Winter</td>
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<tr>
<td>Size/scale</td>
<td>Very High</td>
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<td>Geograph.Inf.</td>
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<td>Duration/Rev.</td>
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<td>Magnitude</td>
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<tr>
<td>Significance</td>
<td>SUBSTANTIAL NEUTRAL</td>
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</table>
replaced with the well defined residential form and appearance of the buildings to the south of the stadium. In particularly, the proposed lower storey townhouses on the southern elevation, would relate to the scale and form of the existing houses. The residential apartments would form a separate element with the towers set above the townhouses. The residential towers would be substantially larger than the existing houses, forming the dominant feature within the view. The proposals would significantly increase the extent of the building mass set against the skyline and occupying a large proportion of the view.

The buildings to the south of the stadium would also significantly enhance the built character and appearance, currently provided by the existing stadium and at the centre of the view. The residential towers would provide well proportioned, harmonious and coherent built elevations, with a strong vertical rhythm of solids and voids. The use of deep reveals, garden roof terraces, balconies and balance of glazing, masonry and terracotta panels would provide a high quality built character. The proposed buildings would be of a higher quality to the existing buildings within the view, helping to raise the quality of the residential built character.

On balance the combination of adverse and beneficial influences, is considered to create a neutral effect.

<table>
<thead>
<tr>
<th>Year 15 - Summer</th>
<th>Size/scale</th>
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<tbody>
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<th>Viewpoint</th>
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<th>Description of Effect</th>
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<tbody>
<tr>
<td>Year 1 - Inter</td>
<td>Medium</td>
<td></td>
<td>The stadium would a new focal feature at the centre of the view. This would replace the existing view of residential tower of Stella House, which would be located behind the proposed stadium. The proposed stadium and hotel would be evidently taller features, appearing above the roofline of the existing buildings in the mid-distant street scene. The extreme sports building and most of residential towers would largely be screened by the existing buildings within the view, with only the very tops being visible above the</td>
</tr>
</tbody>
</table>
The taller Tower C would form a more clearly evident feature of the view. Whilst the stadium, hotel and Tower C would be evidently taller and larger than the existing buildings within the view, the changes would not be disproportionate to the overall massing of buildings or disproportionately occupy the view. The existing visual continuity of the existing built line and massing would be retained and, in the main, clearly understood and appreciated. Whilst the proposed buildings would be seen above this existing street frontage, it would not intrusively impose or overwhelm within the street scene.

The combination of glazed cladding and perforated aluminium screen used within the elevations of the proposed stadium and hotel, would create a modern distinctive appearance that would be clearly different to the existing built character. This would help to emphasise that the change is occurring within a separate part of the street scene, marking the presence of the Club, whilst still retaining the visual integrity of the existing High Road. The proposals would be experienced as a change to the view, occurring predominantly beyond and separate from the main street thoroughfare in the fore and mid ground. The proposed stadium would create a prominent new building mass within the view and combined with the hotel would become new landmark features that would define the presence of the stadium for fans and visitors arriving from the south. The stadium and hotel would form an enhanced focal feature for the street scene, and on balance is considered a neutral change to the view.
The stadium and hotel would form prominent, new large scale buildings, seen above the existing buildings within the street scene. This would form a large scale change on the skyline and occupying a large extent of the view. The existing stadium and Valentino’s pub on the High Street would be removed from the end of the street scene and replaced with the proposed Tottenham Experience building. This would introduce a building of similar scale and massing to the existing buildings along the High Road. The use of cast iron panelling would create a distinctive feature at the centre of the street scene.

The curved and sweeping forms of the proposed stadium glazed curtain walls, and the use of varying degrees of perforations within the aluminium screen of the stadium and hotel would create visual interest and diversity to the built form.

The Project would introduce a clearly different built form and materials within the view, contrasting within the existing street scene. However, this is set against an existing view composed of a poorly defined built form, mixed use and appearance, which lacks visual integrity and cohesiveness and is generally of poor visual character. The Project would introduce a new built character, helping to raise the quality of built appearance and architecture present in much of the view. This would form an important element of the future vision for the urban regeneration planned as part of the High Road West Masterplan. The combination of beneficial and adverse changes, would create a neutral effect.

<table>
<thead>
<tr>
<th>Viewpoint Sensitivity</th>
<th>24</th>
<th>Description of Effect</th>
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</thead>
<tbody>
<tr>
<td>Year 1 – Winter</td>
<td>High</td>
<td>The stadium and hotel would form prominent, new large scale buildings, seen above the existing buildings within the street scene. This would form a large scale change on the skyline and occupying a large extent of the view. The existing stadium and Valentino’s pub on the High Street would be removed from the end of the street scene and replaced with the proposed Tottenham Experience building. This would introduce a building of similar scale and massing to the existing buildings along the High Road. The use of cast iron panelling would create a distinctive feature at the centre of the street scene. The curved and sweeping forms of the proposed stadium glazed curtain walls, and the use of varying degrees of perforations within the aluminium screen of the stadium and hotel would create visual interest and diversity to the built form. The Project would introduce a clearly different built form and materials within the view, contrasting within the existing street scene. However, this is set against an existing view composed of a poorly defined built form, mixed use and appearance, which lacks visual integrity and cohesiveness and is generally of poor visual character. The Project would introduce a new built character, helping to raise the quality of built appearance and architecture present in much of the view. This would form an important element of the future vision for the urban regeneration planned as part of the High Road West Masterplan. The combination of beneficial and adverse changes, would create a neutral effect.</td>
</tr>
<tr>
<td>Size/scale</td>
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<td>Duration/Rev.</td>
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<tr>
<td>Significance</td>
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<tr>
<td>Geograph.Inf.</td>
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<tr>
<th>Viewpoint Sensitivity</th>
<th>25</th>
<th>Description of Effect</th>
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<tbody>
<tr>
<td>Year 1 – Winter</td>
<td>High</td>
<td>The stadium would introduce a prominent large scale and massed building, replacing the existing stadium and visually intrusive roof gantries. This would occupy a large part</td>
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<td>Size/scale</td>
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<td>Duration/Rev.</td>
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<td>Significance</td>
<td>MAJOR NEUTRAL</td>
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of the centre of the view and would be experienced on the skyline above the existing back of houses along the High Road. The built character and appearance of the proposed stadium would also be very different to the existing buildings, but the use of varied proportions of perforated aluminium vertical panels, would help to relate it to the fenestration pattern of the existing buildings. This, combined with the extent of glazing, would also help to reduce the solidity and scale of the massing of the proposed stadium, helping to provide a visual lightness to the structure.

The residential towers would form a peripheral new feature, with mainly only Tower C forming an evident change in the view.

The existing street scene has a poor visual appearance, due to: the garages and back of houses along the High Road; the poorly defined street frontage and boundary treatments; car parks and poor public realm; the ordinary and ubiquitous vernacular elevation treatments to the residential blocks; and the mixed built form and character. The Project would introduce a new built character, helping to raise the quality of built appearance and architecture present in much of the view. This would form an important element of the future vision for the urban regeneration planned as part of the High Road West Masterplan. The combination of beneficial and adverse changes, would create a neutral effect.

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<tbody>
<tr>
<td>Year 1 – Winter</td>
<td>Medium</td>
<td>Low</td>
<td>Most of the Project would be screened by the existing building and street trees within the view. In summer, this would limit the extent of change to a small part of the view, where the upper part of the proposed stadium, would be visible above the four storey residential block in the foreground of White Hart Lane. A more extensive view of the Project would occur in</td>
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<td>Minor Beneficial</td>
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<tr>
<td>Year 15 - Summer</td>
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Significance | MINOR BENEFICIAL
---|---

winter, when filtered views through the existing trees would occur. This would incorporate most of the upper part of the proposed stadium and Tower C, the tops of Tower A and D, and the very edge of the hotel. This would provide a more clearly apparent change to the view and awareness of the extent and size of the Project. The partial screening effect of the trees would limit the influence of the change occurring on the skyline and would help visual integrate within the within the wider existing building mass present within the street scene.

The changes in winter would be experienced with the same context as the other residential towers, such as Charles House, and the three and four storey residential blocks in the view. The proposed buildings would appear as reflecting a similar scale and massing and be proportional to the existing buildings and extent occupied within the view. The Project would introduce a high quality of architecture, detailing and use of materials in comparison to the existing buildings within the view. This would form an important new landmark feature for fans and visitors arriving from White Hart Lane Station and catalyst and benchmark of the future urban regeneration planned as part of the High Road West Masterplan. The Project would create a beneficial effect.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Description of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewpoint 27</td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Medium</td>
</tr>
<tr>
<td>Year 1 – Winter</td>
<td></td>
</tr>
<tr>
<td>Size/scale</td>
<td>Very High</td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>High</td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
</tr>
<tr>
<td>Magnitude</td>
<td>Very High Neutral</td>
</tr>
<tr>
<td>Significance</td>
<td>MAJOR NEUTRAL</td>
</tr>
<tr>
<td>Year 15 - Summer</td>
<td></td>
</tr>
<tr>
<td>Size/scale</td>
<td>Very High</td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>High</td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
</tr>
<tr>
<td>Magnitude</td>
<td>Very High Neutral</td>
</tr>
<tr>
<td>Significance</td>
<td>MAJOR NEUTRAL</td>
</tr>
</tbody>
</table>
The existing stadium poorly relates to the existing street scene, and with the demolition of the intervening buildings between the existing buildings within the view, a large unformed gap exists that opens up the street to the former industrial estate and car park to the front of the existing stadium. This has arisen as part of the vision for enabling the proposed stadium to have the required to enable it to engage actively with the High Road at the centre of the community.

This inevitably leads to a large scale change, within the immediate proximity of the stadium. The proposed stadium would be substantial and much larger than the existing buildings within the view, becoming the dominant feature. It would be seen well above the roofline of the existing Georgian buildings. The proposed form, shape and appearance would be clearly and evidently different to the Georgian buildings. This provides a contrast that enables both types of building to be clearly understood and appreciated in their own right and role they play within the street scene. The vertical rhythm and consistency provided by the perforated aluminium screen and glazing echoes the fenestration within the retained building and helps visually relate it to the street scene. Only part of the proposed hotel and none of the residential towers would be visible within the view.

The Project seeks to retain the existing locally valued buildings, whilst introducing a clearly different modern, high quality architecture that provides the future vision for the planned urban regeneration within Tottenham, whilst also enabling the stadium to provide a visual active role within the street scene. This needs to be balanced against the difference in size and scale between the proposed and existing buildings, and thus is assessed as a neutral effect.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Description of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>provide an important visual role integrating The Project with this part of the High Road.</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Year 1 – Winter</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Size/scale</td>
<td>Low</td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>Low</td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
</tr>
<tr>
<td>Magnitude</td>
<td>Low Neutral</td>
</tr>
<tr>
<td>Significance</td>
<td>MODERATE NEUTRAL</td>
</tr>
</tbody>
</table>

The belt of trees in the mid-distance provides a complete screen for the proposed buildings, other than the residential towers. Even in winter the vegetation is dense enough, combined with other existing buildings to provide an effective screen. Mainly the upper part of Tower C and A would be visible as new features within the view. This would be seen within the same visual context as Kenneth Robbins House, which appear as having a similar massing within the view. The introduction of the proposed residential towers into the view would also be consistent with other tall buildings within the view, such as Brook House.

The view is already affected by the power station, sub-station, pumping station, overhead powerlines and pylon towers, reservoir embankment and industrial units. The Project would introduce a high level of architecture and built form in comparison to the existing buildings, but would be difficult to discern, due to the large distance from the viewer. The proposals would have limited influence on the view and would be experienced as being consistent with the existing more distant built features within the view.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Description of Effect</th>
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<tbody>
<tr>
<td>29</td>
<td>The trees in the fore to mid ground provide an important role in providing a partial screen and integrating the proposed changes into the view. In summer, the proposed stadium, Tottenham Experience building and parts of the Southern Development would be screened. In winter, the density of branch structure would create a visual tracery that provides only glimpses of the proposed buildings through the trees. The main change to the view would be the introduction of the proposed hotel, with secondary limited and partial views of the extreme sports building and residential</td>
</tr>
</tbody>
</table>
towers. These would be experienced as balanced and visually proportionate to the existing building mass within the street scene. The Project would replace the existing stadium, and introduce buildings of modern and high quality architecture, contrasting with the existing buildings within the view. The proposed hotel would partially utilise a perforated aluminium screen as external skin, introducing diagonal and vertical voids to create visual diversity. The aluminium screen would provide a visual connection with the proposed stadium and extreme sports building. The proposed residential towers would introduce further visual diversity and interest through use of deep reliefs, balconies, garden roof terraces, visually strong white masonry framework, and balanced contrasting of glazing and terracotta panels.

Whilst prominent, the changes are well balanced and proportioned, introducing visual character and diversity, and raising the quality of built architecture within the view and would therefore be a beneficial effect. This would provide an important aspect within the future planned urban regeneration for High Road West.

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Year 1 – Winter</th>
<th>Year 15 - Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Size/scale</td>
<td>No Change</td>
<td>No Change</td>
</tr>
<tr>
<td>Geograph.Inf.</td>
<td>No Change</td>
<td>No Change</td>
</tr>
<tr>
<td>Duration/Rev.</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Magnitude</td>
<td>No Change</td>
<td>No Change</td>
</tr>
<tr>
<td>Significance</td>
<td>No Change</td>
<td>No Change</td>
</tr>
</tbody>
</table>

The extent and density of the intervening vegetation would prevent views of the Project, both in summer and winter. Therefore there would be no change to the view.

12.6 Additional Mitigation, Compensation and Enhancement Measures

Construction

12.6.1 Consideration should be given to the visual treatment of the boundaries of development construction
zone. This would typically be provided by hoarding to appropriate barrier to define the area of construction for health and safety reasons and to provide security for the Site. Opportunities should be sought for artwork, visual representations of the Project, temporary green barriers etc.

**Occupation**

12.6.2 No additional mitigations measures are recommended. However, it should be noted that future urban regeneration planned for High Road West and Northumberland Park should ensure a consistency in terms of layout, form, appearance and use of materials. Public realm is a key aspect, as this often forms the links, connectivity and legibility between buildings and street scenes.

**12.7 Assessment Summary and Residual Environmental Impacts and Effects**

**Construction**

12.7.1 The significant effects during the Construction Phase to the Townscape Site Features would occur to the built form. Much of the site comprises open land following the demolition of many of the existing buildings as part of the partial implementation of the existing consented development that has created a transitional character. The removal of most of the remaining existing townscape site features would occur early on in the construction phase of the Project, with the exception being parts of the existing stadium, where there would be a phased approach to its removal to facilitate continued use for matches. Most of the changes during the construction period would relate to the construction of the new buildings and the public realm, which would form significant new site features. The demolition works and the construction of the new buildings would also create a major or substantial change to the character of Townscape Character Area (TCA) 1: Stadium and TCA 2: Tottenham High Road and within views approximately up to 400m from the Project.

12.7.2 The effects during the construction phase would not be substantively greater, in terms of size/scale and geographical influence, to that of the effects at Operation stage from Year 1. However, there would be noticeable activity through the process of continual change, visual disruption, movement, the visually intrusive appearance of the inner core of new buildings and partial demolition of the existing stadium, and the need for tall cranes to complete specific parts of the Project. With the exception of TCA 1: Stadium, the effects on townscape and views during Construction would be adverse. In the case of TCA 1, the change is assessed as neutral, due to the extensive amount of demolition work that has already occurred and is ongoing, and the sense of transition that is taking place within the Area.

12.7.3 The construction period would be phased in terms of staged completions and would represent a number of years of construction activity. However, in townscape and visual assessment terms this would be a relatively short period of time compared to the total life expectancy of the Project.

12.7.4 In comparison to consented development, the construction requirements and type of works would be broadly the same due to the similar nature of the proposed development. The proposed phasing of the work would also be undertaken in a similar manner.

12.7.5 The key differences between the consent and current Project would be a slightly longer construction period, with the proposed Stadium requiring an additional 6 months to the 3 years and 4 months to construct the consented Stadium, and an additional 8 months to the 2 years for the consented mixed use
development. The other main difference would be the additional height of the proposed residential towers. This would include the requirement to utilise much taller cranes to construct the tops of the towers, in particular Tower C. The additional timescale for completion of the construction works would be a relatively small proportion of the overall construction period. The visual disruption resulting from the construction of the towers and requirement to use cranes of much greater height would create an additional adverse effect over a wider area, but would form a short-term temporary effect.

**Occupation**

12.7.6 There are no additional mitigation measures proposed, with mitigation being incorporated as an inherent element of the design process prior to assessment. Consequently, the assessed effects can be regarded as being residual effects.

12.7.7 As for the construction phase, the Project would create substantial and major changes to the site. These would noticeably affecting the built features within the site, the character of the townscape within and immediately adjacent to it and for views principally within approximately 400m. The Project incorporates the demolition of the existing stadium and Spurs Store, similar to the consented development, but also incorporates the demolition of the retained locally listed Victorian buildings of 746, 748 and 750 High Road and the residential properties of 20-32 Worcester Avenue. In common with the consented development, the Project would introduce: a substantially larger stadium compared with the existing stadium by occupying much of the site; the provision of a southern mixed used development, incorporating a predominantly residential use; and the addition of an extensive new area of public realm. In contrast to the consented scheme, the Project also incorporates a hotel, an extreme sports building, a revised layout and design for the southern development and the addition of the proposed north building in the location of the demolished houses on Worcester Avenue.

12.7.8 The design of the built form, layout and appearance of the proposed buildings and public realm to the south of the proposed stadium has substantially changed in comparison to the consented development, representing a significant change. The Project would create a more varied and diverse visual form, breaking up the massing of the built form, but also noticeably increasing the height of the buildings, in particular through the inclusion of the proposed hotel to the south-west of the site, and to a lesser extent the neighbouring proposed extreme sports building, and the much larger four residential towers to south-east of the site. The location and heights of the towers have been designed to ensure that the tallest tower lies closest to the proposed stadium and within the centre of the cluster of towers. The use of a chamfered profile applied to the most prominent outer elevation on the lower and upper parts of the towers, enables a greater efficiency of space and maximising of the public realm, whilst also helping reduce the visual massing of the towers. Within the top of the towers this would be combined with garden roof terraces to establish a greater sense of openness, as well as visual interest.

12.7.9 Within close proximity to the site, the Project would result in significant effects (i.e. Substantial or Major significance of effect) to the site’s built form, TCA 2: Tottenham High Road, and representative viewpoints: 17 (Northumberland Park and the junction with Worcester Avenue); 21 (Corner of Vicarage Road and Park Lane); 22 (Bromley Road); 24 (Breton Road); 25 (Whitehall Street); 27 (High Road at the junction with White Hart Lane). Changes to the built form, TCA 2, and Viewpoint 21 would be Beneficial, with a Neutral effect on the other views. A small number of townscape and visual effects were assessed as adverse in nature including; TCA8 Bruce Castel Mixed Open Space and Viewpoints, 10 (Tottenham Cemetery), 11 and 12 (Bruce Castle Park). However, the level of these effects were considered no
greater than Moderate.

12.7.10 Further from the site the effects would dissipate with distance. In relation to townscape character areas other than TCA 1 and TCA2, the changes from the Project would largely be understood as occurring beyond and separate from the character area and would thereby retain the existing continuity and integrity of the townscape, whilst introducing a new focal feature to some streetscapes. Within views, the extent of change experienced is influenced by the presence of existing buildings of varying size and scale and intervening vegetation that filters or completely screens views of the Project. Typically, the changes would be experienced as part of a wider view that already incorporates varied built form, scale and appearance, often of relatively poor quality and limited vernacular treatment. The Project would introduce new buildings that are of higher quality, and due to the influence of distance and perspective, would be experienced as being proportionate to the existing features within the view. The most noticeable long distance view that would be effected, would be from Viewpoint 1: Alexandra Palace where there would be a Moderate Beneficial significance of effect.

12.7.11 A number of fully rendered Accurate Visual Representations (AVRs) have been provided from a number of viewpoints to illustrate the appearance of the Project. In addition a number of wireframes have been produced to appreciate the scale and location of the Project within views. The assessed effects include a mix of Adverse, Neutral and Beneficial influences. The nature of the change primarily relates to a comparison with the existing urban fabric, condition, architectural quality and appearance, and the extent of change relative to similar features and character.

12.7.12 The additional loss of existing buildings compared to the consented scheme would be detrimental to the built form, but would be limited to a localised context and offset by other beneficial changes to the public realm and townscape arising from the Project. Within Worcester Avenue the change in built form would result in the reduction in the remaining residential part of the street scene and replaced with a three storey commercial building. Whilst of different character to the remaining residential properties, the proposed north building would provide enclosure and redefinition of the street frontage. 746, 748 and 750 High Road provide a piecemeal frontage to the street. The gaps between the buildings, combined with the much larger opening in the street frontage, results in the existing stadium, car parking and areas of cleared land exerting a much more notable visual influence on the townscape character of the High Road corridor. The poor visual appearance of the remaining existing buildings, the ordinary appearance of the existing Spurs Store and the disjointed alignment of the building line, would be replaced with a clearly defined layout form and appearance, creating a more integrated built character that links the High Road to an extensive area of public realm, whilst also providing a continuity and visual containment to the street built frontage. The poor condition of Warmington House would be restored to its former historic appearance securing its future as an integral part of the streetscape. The introduction of retail units, café and museum would revitalise the space around a new area of public realm on the High Road, creating an active frontage. The proposed Tottenham Experience and museum would create a new 3 storey built form that includes distinctive cast iron panels to the facades. The elevational treatment would be a contrast but sympathetic to the historic built character of the retained Warmington House enabling the historic buildings to be understood in the context of the new modern architecture.
notable improvement over the existing stadium. The proposed stadium would relate to the new Sainsbury’s Store building, in terms form, massing and appearance, as originally envisaged as part of the consented development. The balanced mixture of glazing and cladding, with form and pattern varied on different elevations, and the use of varying degrees of perforation within the aluminium panels that express an outer skin would create a sense of lightness, free flowing shapes and animation to the elevations. This would also create visual interest and detailing that would help to reduce the building’s scale and mass, yet still provide a building with a uniform appearance. The articulation of the elevations with a mix of solid panels, voids and varying degrees of perforation, as well as openings for vents, would provide visual relief and interest that provides a relationship with the fenestration pattern of the neighbouring existing buildings.

12.7.14 The proposed hotel, extreme sports building and residential towers would constitute a major change to the built form, within the site and surroundings. The introduction of town houses and residential towers on Park Road and Worcester Road would provide a more appropriate townscape character compared with the rear facades of the existing stadium. This would create more active street frontages that relate to the residential character of the neighbouring street scenes. The large scale of the Project in comparison to neighbouring houses would only be clearly evident in close proximity. However, the viewer would be predominantly aware of changes at the street level, where the view would be greatly enhanced by the improved quality of the built form and appearance (e.g. Viewpoint 21). The use of chamfered profile to the residential towers set above the townhouses, would enable an efficient use of space, enabling a greater depth of public realm. The residential towers would incorporate deep reliefs, balconies, garden roof terraces, a strong white masonry framework and balanced mixture of glazing and natural coloured terracotta panels. This would create strong architectural quality and detailing, providing an enhanced built quality and appearance to the townscape. The proposed hotel would utilise glazing and varied proportions and forms of outer skin of perforated aluminium panels, visually relating it to the proposed stadium. The elevation treatment would create visual interest and diversity to local street scenes and townscape character. The proposed extreme sports building would create a simple but distinctive form and articulation, which extends into the elevation treatments through the use contrasting tonal pre-cast concrete and glazing. This would provide a striking building between the proposed hotel and residential towers.

12.7.15 The proposed public realm works, would contribute a greatly enhanced area of benefit to both fans on match days and to the wider local community and visitors at other times. This would improve legibility and movement, as well as providing dynamic spaces at different levels. In common with the consented development, the Project would use high quality paved materials, creating areas for interaction, seating and planting, as well as clearly defined areas for the movement of large numbers of people on match days. Tree planting would be increased in comparison to the consented development, which would be particularly beneficial within the local street scenes of the High Road, Park Lane and Worcester Avenue.

12.7.16 The scale and mass of the proposed buildings would be much greater than the existing built character along High Road. This would change the historical context of the street scene, in terms of the scale, form and appearance of the existing buildings that define the character at this part of the route. Nevertheless, the proposals would reflect the evolving character of the High Road, and whilst a major change, would create a significant destination along the High Road, defined by high quality architecture. The presence of THFC within the community of Tottenham would be more positively and effectively engaged with the street scene of the High Road. The proposals also enable a more extensive area of public realm to be created along the High Road, within enhanced public access, movement and legibility, which extends into
the adjoining parts of the site. The use of high quality paving materials, water features, raised planting beds, seating and additional new trees, would all enhance the character and appearance of this part of the part of the High Road corridor.

12.7.17 Despite the height and scale of buildings, the changes would provide buildings of high quality modern architecture and detailing, creating a positive attribute to the site. These changes would introduce distinctive modern architectural buildings, which would define the site and act as a catalyst for further urban regeneration within the locality. The buildings would become landmark features that evidently enhances the existing built quality in the site and local townscape character.

12.7.18 Overall on balance the Project would create a notable enhancement to the townscape character and views by providing a well-defined and formed built character and public realm, through high quality architecture and materials. The Project would create a unity and coherence of built character, whilst also providing visual diversity. The changes are seen as an important element in the proposed vision for the wider townscape regeneration of the locality.
13. Noise and Vibration

13.1 Introduction

13.1.1 This chapter of the ES has been produced by WSP | Parsons Brinckerhoff. It presents an assessment of the potential noise and vibration effects that the Project may have on the surrounding environment. The assessment includes a summary of the baseline conditions within the area and identifies mitigation measures where appropriate for significant effects that may arise as part of the project.

13.1.2 An assessment of the suitability of the site for residential development is presented at the end of this chapter.

13.1.3 This chapter is necessarily technical in nature. As such, a glossary of acoustic terminology is presented in Appendix 13.1.

13.1.4 Whilst this chapter has been produced by WSP | Parsons Brinckerhoff it incorporates noise predictions undertaken by Vanguardia Consulting (who specialises in stadium acoustic design) for the purpose of the detailed design work. It has been stated at the appropriate points where Vanguardia’s work has been used.

13.2 Assessment Criteria and Methodology

Previous Assessment

13.2.1 The May 2010 planning application submitted to Haringey Council (application reference HGY/2010/1000) for a new stadium along with retail, residential and a hotel included a noise assessment prepared by WSP in the form of a technical chapter in the environmental statement. The retail element of the previous planning application related to the Sainsbury store in the north of the development. This has subsequently been built and, therefore, does not form part of this current application.

13.2.2 This chapter builds on the findings of the May 2010 assessment. It also uses the baseline noise survey data gathered for the 2010 assessment.

Scoping Opinion

13.2.3 Although a formal Scoping Opinion was not sought the Scope of the EIA was based on the technical scope for the original 2010 ES and the Southern Addendum. A draft Scoping Report was sent to the Council on the 19th June 2015, for their informal comments and discussion. No informal comments were received in relation to the Noise and Vibration draft Scope.

Legislative Context

13.2.4 There is no legislation that specifies noise emission limits from development proposals such as these. Relevant noise legislation is either EC-derived and focussed on specific items of noise-emitting plant or is part of UK statutory nuisance law including provisions such as those within the Control of Pollution Act 1974 or the Environmental Protection Act 1990.

13.2.5 Sections 60 and 61 of the Control of Pollution Act give the local authority special powers for controlling
noise arising from construction and demolition works, regardless of whether a statutory nuisance has been caused or is likely to be caused. These powers may be exercised either before works start or after they have started.

13.2.6 Section 60 enables a local authority to serve a notice of its requirements for the control of site noise on the person who appears to the local authority to be carrying out, or to have control over, the works. Greater detail regarding the matters that local authorities should take account of when preparing such a notice and the appeal provisions that exist are to be found in BS 5228-1:2009+A1:2014.

13.2.7 Section 61 of the Control of Pollution Act provides a mechanism for the contractor or developer to take the initiative and approach the local authority to ascertain its noise requirements before construction work starts.

13.2.8 Currently statutory nuisance encompasses a range of matters that has broadened to include topics such as noise and vibration where potential health effects may be less obvious. Section 79 of the Environmental Protection Act 1990 (as amended) declares a range of matters to be statutory nuisances that includes:

\[(g)\] noise emitted from premises so as to be prejudicial to health or a nuisance;

\[(ga)\] noise that is prejudicial to health or a nuisance and is emitted from or caused by a vehicle, machinery or equipment in a street;"

13.2.9 For the purposes of the Environmental Protection Act, ‘noise’ includes vibration.

13.2.10 Under the provisions of the Environmental Protection Act, the local authority is required to periodically inspect its area to detect any nuisance and, where a complaint of a statutory nuisance is made by a person living within its area, take such steps as are reasonably practicable to investigate the complaint.

13.2.11 If as a result of investigations the local authority is satisfied of the existence of a statutory nuisance it is obliged to serve an abatement notice. This may require various measures including cessation of the noise, its attenuation or restriction to certain times. At its discretion the local authority can delay the service of a notice for up to seven days if it is pursuing alternative means of securing abatement of the nuisance.

13.2.12 In situations where some part of the activity for which planning permission has been sought may be subject to another more appropriate means of statutory control, e.g. a licensing condition, planning guidance draws attention to the benefits of the local planning authority consulting with the relevant bodies and authorities. A planning permission should not seek to duplicate such controls. For example, the Government considers that the Building Regulations are the most appropriate means of control for sound insulation between dwellings and local planning authorities should not therefore use planning conditions to control sound insulation in such cases.

13.2.13 With the implementation of the Licensing Act 2003 came clear guidance that duplication of controls should be avoided wherever possible. Although intended for licensing the following paragraphs reproduced from Government Guidance makes this clear:
13.2.14 “The Statement of Licensing Policy should indicate that planning, building control and licensing regimes will be properly separated to avoid duplication and inefficiency… This would enable the planning committee to have regard to such matters when taking its decisions and avoid any unnecessary overlap.”

Planning Policy and Guidance

National Planning Policy

13.2.15 The NPPF sets out the following generic guidance in paragraph 123.

13.2.16 “Planning policies and decisions should aim to:

- avoid noise giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”

13.2.17 Reference numbers 27 and 28 point respectively to the Explanatory Note to the Noise Policy Statement for England (NPSE) and the provisions of the Environmental Protection Act 1990 and other relevant law.

13.2.18 No alternative detailed guidance has been proposed by the Government as a direct replacement for Planning Policy Guidance 24: Planning and Noise, although a review of technical guidance is being undertaken.

Noise Policy Statement for England 2010

13.2.19 The NPSE was published in March 2010 by the Department for Environment Food and Rural Affairs (DEFRA) and is the overarching statement of noise policy for England. It applies to all forms of noise other than occupational noise, setting out the long term vision of Government noise policy which is to:

“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”

13.2.20 That vision is supported by the following aims which are reflected in the aims for planning policies and decisions in paragraph 123 of the NPPF (see 13.2.15 above):

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.”

13.2.21 The Explanatory Note to the NPSE introduces three concepts to the assessment of noise in this country:
NOEL – No Observed Effect Level – This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observable Adverse Effect Level – This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level – This is the level above which significant adverse effects on health and quality of life occur.

13.2.22 None of these three levels are defined numerically in the NPSE and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent a SOAEL for noise is acknowledged and the NPSE asserts that not stating specific SOAEL values provides policy flexibility in the period until there is further evidence and guidance.

Planning Practice Guidance

13.2.23 In March 2014 the Government published the web-based Planning Practice Guidance (PPG). The section on noise includes a table which summarises the noise exposure hierarchy and offers examples of outcomes relevant to the NOEL, LOAEL and SOAEL effect levels described in the NPSE. There is still no numerical guidance regarding the NOEL, LOAEL and SOAEL.

Local Planning Policy

Current Planning Policy

13.2.24 The current Haringey Council development plan comprises three main documents:

- Local Plan: Strategic Policies (adopted March 2013);
- Saved UDP (Unitary Development Plan) Policies; and

13.2.25 The pertinent parts of the above documents are set out below.

Local Plan: Strategic Policies

13.2.26 Prior to the Government publishing the NPPF, this document was titled Core Strategy. However, in March 2013 the Local Plan: Strategic Policies was formally adopted.

13.2.27 The Local Plan states in Section 7.1 Health and Wellbeing (inter alia):

“This many measures set out in the Local Plan play a part in promoting good health and addressing health inequalities, for example:

Lessening environmental impacts including air and noise pollution (see SP6).”

13.2.28 Additionally, in Section 7.1 it states:
“Spatial planning can also reduce and mitigate adverse impacts on health, by managing noise and air pollution, and designing walking routes and cycle lanes.”

13.2.29 No other references are made to noise and vibration.

Saved UDP Policies

13.2.30 The UDP was adopted by the Council July 2006 and was the main statutory plan that related to the development and use of land and buildings for Haringey. It contained policies on housing, jobs, leisure, transport education and health. The plan has been superseded by the Local Plan: Strategic Policies document. However, some of the UDP policies have been saved; those which relate to noise are set out below (inter alia).

“UD3: GENERAL PRINCIPLES
The Council will require development proposals to demonstrate that:

a) there is no significant adverse impact on residential amenity or other surrounding uses in terms of loss of daylight or sunlight, privacy, overlooking, aspect and the avoidance of air, water, light and noise, pollution (including from the contamination of groundwater/water courses or from construction noise) and of fume and smell nuisance;”

“ENV6: NOISE POLLUTION
The Council will ensure that new noise sensitive development is located away from existing, or planned sources of noise pollution. Potentially noisy developments should only be located in areas where ambient noise levels are already high and where measures are proposed to mitigate its impact.

13.2.31 The informative text to Policy ENV6 states:

“Noise pollution has a major effect on amenity and health and therefore the quality of life in general. Its effect can be minimised by separating new noise sensitive development from major noise sources, by separating new noisy development from existing noise sensitive development and by taking measures to reduce any impact. The Council will support new technologies and encourage sensitive design and construction, for example by positioning buildings and landscaping as noise barriers. Noise sensitive development includes housing, schools and hospitals.

In assessing planning applications the Council will have regard to PPG24 ‘Planning and Noise’ (Annex 1), and the Mayor of London’s Ambient Noise Strategy and the prevention of a gradual upward creep in background noise levels. Potentially noisy developments should only be located in areas where ambient noise levels are already high. In cases where separation is not possible, the impact of noisy development on ambient noise levels should be assessed, for example by an Environmental Assessment, the application of Best Available Techniques and relevant technology and design guidance. Where new noise-sensitive development is proposed in areas already exposed to high ambient noise levels, the Council may require the submission of an acoustic report to comply with PPG 24. Mitigation measures will be secured by planning conditions or planning obligations where appropriate. The issue of measures to control noise from restaurants, cafes, drinking establishments and hot food takeaways is addressed in Policy TCR5.”
“CLT4: HOTELS, BOARDING HOUSES AND GUEST HOUSES

Applications for hotels, boarding houses and guest houses will be permitted provided that:

c) the proposal does not have an adverse impact on the amenity of nearby residential properties or other uses.

Proposals should not have an adverse impact on the environment by reason of noise, disturbance, traffic generation, exacerbation of parking problems, or detract from the character of the area. In general the local need for uses will be assessed in light of a strong presumption against the loss of residential accommodation.”

London Plan 2011

13.2.32 The London Plan 2011 sets out planning policies, strategies and guidance at national and regional level, and collectively provides a framework within which local people and councils can produce their own local and neighbourhood plans.

13.2.33 It provides the following policies (inter alia) which relate to noise.

“Policy 5.3 Sustainable design and construction

Strategic

A The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.

Planning decisions

B Development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process.

C Major development proposals should meet the minimum standards outlined in the Mayor’s supplementary planning guidance and this should be clearly demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:

D minimising pollution (including noise, air and urban run-off).

LDF preparation

13.2.34 Within LDFs boroughs should consider the need to develop more detailed policies and proposals based on the sustainable design principles outlined above and those which are outlined in the Mayor’s supplementary planning guidance that are specific to their local circumstances.”
“Policy 7.15 Reducing noise and enhancing soundscapes

Strategic

A The transport, spatial and design policies of this plan will be implemented in order to reduce noise and support the objectives of the Mayor’s Ambient Noise Strategy.

Planning decisions

B Development proposals should seek to reduce noise by:

a minimising the existing and potential adverse impacts of noise on, from, within, or in the vicinity of, development proposals
b separating new noise sensitive development from major noise sources wherever practicable through the use of distance, screening, or internal layout in preference to sole reliance on sound insulation
c promoting new technologies and improved practices to reduce noise at source.

LDF preparation

C Boroughs and others with relevant responsibilities should have policies to:

a reduce the adverse impact of noise through the distribution of noise-making and noise-sensitive uses, and in highway management and transport policies (see Chapter 6)
b protect Quiet Areas, to be formally identified under the Environmental Noise (England) Regulations 2006 (as amended) and consider protection of spaces of relative tranquillity or high soundscape quality, particularly through borough open space strategies.”

13.2.35 On October 11th 2013 the Mayor published Revised Early Minor Alterations to the London Plan (REMA). From this date, the REMA are operative as formal alterations to the London Plan and form part of the development plan for Greater London. The REMA make no alterations to Policy 5.3, whilst a single sentence is added to Paragraph 7.52, which supports Policy 7.15. This additional sentence makes the point that London Plan policies may require further alteration “depending on the spatial implications of the Noise Policy Statement for England”.

13.2.36 On 10th March 2015, the Mayor published Further Alterations to the London Plan (FALP). From this date, the FALP are operative as formal alterations to the London Plan and form part of the development plan for Greater London. The FALP also do not alter Policy 5.3, but Policy 7.15 has been substantially re-drafted as reproduced below.

“Policy 7.15 Reducing and managing noise, improving and enhancing the acoustic environment and promoting appropriate soundscapes

Strategic

A The transport, spatial and design policies of this plan will be implemented in order to reduce and manage noise to improve health and quality of life and support the objectives of the Mayor’s Ambient Noise Strategy.
Planning decisions

B Development proposals should seek to manage noise by:

a avoiding significant adverse noise impacts on health and quality of life as a result of new development;
b mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business;
c improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity);
d separating new noise sensitive development from major noise sources (such as road, rail, air transport and some types of industrial development) through the use of distance, screening or internal layout – in preference to sole reliance on sound insulation;
e where it is not possible to achieve separation of noise sensitive development and noise sources, without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through the application of good acoustic design principles;
f having particular regard to the impact of aviation noise on noise sensitive development;
g promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.

LDF preparation

C Boroughs and others with relevant responsibilities should have policies to:

a manage the impact of noise through the spatial distribution of noise making and noise sensitive uses;
b identify and nominate new Quiet Areas and protect existing Quiet Areas in line with the procedure in Defra’s Noise Action Plan for Agglomerations.”

Emerging Planning Policy

13.2.37 Haringey Council is currently preparing the Development Management Development Plan Document (DPD), the Sites Allocation DPD and the North London Waste Plan which will add to the above three documents to comprise the LDF portfolio. The latter two documents are not relevant to this assessment.

13.2.38 The Development Management DPD consultation document was published in February 2015. Policy DM34 Environmental Protection states:

“Noise and Vibration

C. The Council will seek to ensure that new noise sensitive development is located away from existing or planned sources of noise pollution. Potentially noisy developments may be refused if it cannot be suitably demonstrated that measures will be implemented to mitigate its impact.
D. A noise assessment will be required to be submitted if the proposed development is a noise sensitive development, or an activity with the potential to generate noise."

13.2.39 The supporting text to Policy DM34 states:

“Noise pollution has a major effect on amenity and health and therefore the quality of life in general. Its effect can be minimised by separating new noise sensitive development from major noise sources, by separating new noisy development from existing noise sensitive development and by taking measures to reduce any impact. Noise sensitive development includes housing, schools and hospitals.

Any mitigation measures should be incorporated into the design prior to the submission of an application.”

**Guidance/ Best Practice**

13.2.40 Guidance relating to the prediction and assessment of demolition and construction phase noise and vibration effects has been taken from the following documents.


13.2.41 The following documents are appropriate to the measurement of baseline noise levels and assessing noise of an industrial or commercial nature emanating from existing, new or proposed commercial premises.


13.2.42 The following documents are relevant to the prediction and assessment of traffic noise affecting existing and proposed developments:

- HD 213/11, revision 1, Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 7 Noise and Vibration.

13.2.43 The following documents are relevant when assessing noise affecting sensitive receptors, whether proposed or existing:


13.2.44 The following document is relevant for assessing noise from music events:

13.2.45 The above guidance is set out in more detail in Appendix 13.2.

Baseline Data Collection

13.2.46 A noise survey was carried out in 2008 in order to establish the existing noise climate at the potentially sensitive areas surrounding the Project Site. The noise climate in the area is mostly dominated by road traffic noise. As the road traffic flows are unlikely to have changed such that they would significantly influence the measured noise levels, it is considered that the data gathered during the 2008 survey are valid for use in this assessment.

13.2.47 The baseline noise survey was conducted at various locations and over different periods between Tuesday 11 November and Monday 24 November 2008 using a combination of unattended continuous monitoring locations and attended short term measurement locations.

13.2.48 An attended noise survey was conducted at the current White Hart Lane stadium to determine the noise levels associated with a typical near capacity Premier League football match, including the arrival of supporters’ coaches, and the arrival and departure of supporters. This was undertaken on the evening of Wednesday 12 November 2008 for a Carling Cup match between Tottenham Hotspur and Liverpool, with a 19:45 hours kick off time. This happened to be a relatively high scoring game with a final result of 4:2 to Tottenham Hotspur and as such the data collected are considered to be representative of existing ‘worst case’ conditions for noise during a match.

Consultation

13.2.49 The proposed duration and sites of the baseline noise monitoring for the project were discussed and agreed with the Haringey Council Environmental Health Officer by correspondence in November 2008 in relation to the May 2010 planning application. The data gathered for the purpose of the previous application and have been approved verbally for use in the current assessment by Haringey Council.

13.2.50 The measurement locations are marked on Figures 1, 2 and 3 in Appendix 13.3.

13.2.51 Five unattended noise monitoring sites were used to obtain weekday and weekend data by continuous measurement. A further eight attended measurements locations were used on the evening of 12 November 2008, two inside the stadium, five outside, and another external location for a 3-hour attended CRTN road traffic noise measurement on Park Road on 19 November 2008. The locations have been prefixed by the letter P for the long term positions, S for the two within the stadium and R for the short term rotational measurements outside the stadium. The monitoring sites are described in detail in Appendix 13.3.

13.2.52 Details of the noise measurement equipment used for the baseline noise survey are given in Appendix 13.4.

13.2.53 The sound level meters and the sound level calibrator used with them were all respectively within two years and one year of calibration by a UKAS accredited laboratory. The measurement systems were checked for their calibration level at the commencement and end of each series of measurements and no significant drift in the measured level was found to have occurred. Typically the accuracy of Type 1 sound level meters, such as those used for the baseline survey, when employed in the field is within ± 1 dB. However, the measurements may also be subject to meteorological effects. In the case of the measurement locations used, such meteorological effects are likely to have been small due to the relative

Tottenham Athletic Football Club Limited

September 2015

13.10
proximity of the major source of ambient noise at each site, i.e. the adjacent road.

13.2.54 The weather during the survey generally was conducive to sound measurement, being predominantly dry and with wind speeds of generally less than 5 ms\(^{-1}\).

13.2.55 The measurement data were post-processed to yield statistical noise levels for hourly periods, including \(L_{A_{eq},1h}\), \(L_{A_{90},1h}\), \(L_{A_{50},1h}\), \(L_{A_{10},1h}\), \(L_{A_{max}}\) and the \(L_{A_{min}}\). Explanation of these terms is included in Appendix 13.1.

13.2.56 Data for longer periods, such as the 16 hour day (07:00 to 23:00) and the 8 hour night (23:00 to 07:00) have been analysed directly from the logged measurement data.

**Assessment Methodology**

13.2.57 The assessment methodology differs slightly from that set out within Chapter 2. For this assessment, it is considered that there would be very little or no difference in an impact of ‘low’ and ‘very low’ as shown in Chapter 2. Similarly, there would be little difference between ‘high’ and ‘very high’. Instead the following scale has been adopted for the noise assessment.

**Table 13.1: Receptor Sensitivity and Impact Magnitude**

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity to Change</td>
<td>Magnitude of Change</td>
</tr>
<tr>
<td>Major</td>
<td>Major</td>
</tr>
<tr>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Minor</td>
<td>Minor</td>
</tr>
<tr>
<td>Negligible</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

**Table 13.2: Effect Significance**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Receptor Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>Major</td>
</tr>
<tr>
<td>Mod</td>
<td>Moderate</td>
</tr>
<tr>
<td>Minor</td>
<td>Moderate</td>
</tr>
<tr>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Minor</td>
<td>Moderate</td>
</tr>
<tr>
<td>Mod</td>
<td>Moderate</td>
</tr>
<tr>
<td>Major</td>
<td>Major</td>
</tr>
</tbody>
</table>

13.2.58 A description of the above terms is set out below.

- Major negative or positive impact: Where the project could be expected to have a very significant impact (either negative or positive) on the existing noise environment;
- Moderate negative or positive impact: Where the project could be expected to have a noticeable impact (either negative or positive) on the existing noise environment;
- Minor negative or positive impact: Where the project could be expected to result in a small, barely noticeable impact (either negative or positive) on the existing noise environment; and
- Negligible impact: Where no discernible impact is expected as a result of the project on the existing noise environment.

13.2.59 The impact significance for the construction and operational phases are set out below along with a general approach to the assessment.

**Construction Noise**

13.2.60 The methodology adopted for the prediction of construction noise impacts follows that set out in BS 5228 (see Appendix 13.2).

13.2.61 The BS 5228 calculation methods allow accurate noise levels to be determined for various construction activities. However, the value of any such predictions necessarily is limited by the number of assumptions that have to be made regarding the number and type of plant to be utilised, their location and detailed operating arrangements. Some of this information will be clarified as the project design progresses and later when resources are mobilised, but other information (such as exactly where the plant operates and for how long) will remain uncertain, even after works have commenced.

13.2.62 As a consequence, the available information is considered sufficient to perform a generic construction phase noise assessment, focussing on key activities, with the aim of identifying whether a significant, albeit temporary, noise impact is likely to arise at the nearest sensitive receptors.

13.2.63 Construction activities may be undertaken over a seven day period. As such, assessment criteria have been derived for the typical construction working day (Monday to Friday 08:00 to 18:00 hours and Saturday 08:00 to 13:00 hours) and for the possible extended period of Saturday 13:00 to 18:00 hours and Sunday 08:00 to 18:00 hours. The criteria for the extended period are 5 dB lower than those for the typical construction working day.

13.2.64 The following assessment criteria apply.

**Table 13.3: Impact Significance for Construction Noise – Core Working Day, Façade dB L_{Aeq,T}**

<table>
<thead>
<tr>
<th>Level of Noise Solely from Construction Works</th>
<th>Scale of Effect Significance</th>
<th>Significance of Noise Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;65 dB L_{Aeq,T} (T – the time period over the core working day)</td>
<td>Negligible</td>
<td>Insignificant</td>
</tr>
<tr>
<td>66 to 70 dB L_{Aeq,T} (T – the time period over the core working day)</td>
<td>Minor negative</td>
<td></td>
</tr>
<tr>
<td>71 to 75 dB L_{Aeq,T} (T – the time period over the core working day)</td>
<td>Moderate negative</td>
<td>Significant</td>
</tr>
<tr>
<td>&gt;76 dB L_{Aeq,T} (T – the time period over the core working day)</td>
<td>Major negative</td>
<td></td>
</tr>
</tbody>
</table>
Table 13.4: Impact Significance for Construction Noise – Extended Period, Façade dB $L_{Aeq,T}$

<table>
<thead>
<tr>
<th>Level of Noise Solely from Construction Works</th>
<th>Scale of Effect Significance</th>
<th>Significance of Noise Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60 dB $L_{Aeq,T}$ (T – the time period over the core working day)</td>
<td>Negligible</td>
<td>Insignificant</td>
</tr>
<tr>
<td>61 to 65 dB $L_{Aeq,T}$ (T – the time period over the core working day)</td>
<td>Minor negative</td>
<td></td>
</tr>
<tr>
<td>66 to 70 dB $L_{Aeq,T}$ (T – the time period over the core working day)</td>
<td>Moderate negative</td>
<td>Significant</td>
</tr>
<tr>
<td>&gt;71 dB $L_{Aeq,T}$ (T – the time period over the core working day)</td>
<td>Major negative</td>
<td></td>
</tr>
</tbody>
</table>

**Construction Vibration**

13.2.65 Vibration may arise at several stages of the construction process, the most common being during demolition and the construction of the foundations. Dropping heavy elements of a demolished building can result in very high energy impacts that may generate significant levels of vibration at considerable distance from the point of impact. More commonly the deployment of large mechanical excavators with pneumatic breakers to take up concrete foundations and hardstandings can be a source of vibration to more local sensitive receptors.

13.2.66 The other common source of vibration is piling activity. Although auger piling, the method predominantly intended to be used in this project, is likely to produce much lower vibration levels than an alternative such as driven piling there are elements of the process that can produce significant vibration. Driving the pile casing or the auger striking an underground obstruction are two examples. There may be some sheet piling required and this process of piling usually generates a higher vibration level than auger piling.

13.2.67 The construction vibration assessment criteria are set out below. These criteria should apply to construction at all times, whether that is during typical construction working hours or the extended period noted in paragraph 13.2.63.

Table 13.5: Impact Significance for Construction Vibration, PPV mm/s

<table>
<thead>
<tr>
<th>Level of Construction Vibration Works Solely from</th>
<th>Scale of Effect Significance</th>
<th>Significance of Noise Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.29</td>
<td>Negligible</td>
<td>Insignificant</td>
</tr>
<tr>
<td>0.3 to 0.9</td>
<td>Minor negative</td>
<td></td>
</tr>
<tr>
<td>1.0 to 4.9</td>
<td>Moderate negative</td>
<td>Significant</td>
</tr>
<tr>
<td>&gt;5.0</td>
<td>Major negative</td>
<td></td>
</tr>
</tbody>
</table>

13.2.68 The levels of vibration likely to cause even cosmetic building damage are generally an order of magnitude greater than those levels which occupiers are likely to find disturbing. Therefore, for this particular situation it is highly unlikely that vibration sufficient to cause damage to property will occur and no significance criteria have been allocated to the building damage criteria – see Appendix 13.2.

13.2.69 Guide values for cosmetic damage to buildings that might arise from construction activity are described in BS 5228-2:2009+A1:2014 (Table B.2 of Annex B to the BS) and reproduced in Appendix 13.2. Minor damage is possible at vibration magnitudes which are greater than twice those given in Table B.2 of BS 5228 Part 2 and major damage can occur at values greater than four times the guide values.

13.2.70 The vibration limits relate to the maximum ground vibration occurring in any one of three mutually perpendicular axes (one of which will be vertical). As a practicable means of control for construction

works the vibration normally would be measured at the foundation of the building being monitored or alternatively a point low on the main load bearing wall at ground level.

**Operational Road Traffic Noise**

13.2.71 The likely change in road traffic noise as a result of development related traffic movements has been predicted in accordance with the methodology contained within the Department of Transport technical memorandum *Calculation of Road Traffic Noise* (CRTN) (1988). The road traffic noise predictions with and without the proposed development have been undertaken using the Annual Average Daily Traffic (AADT) flows provided in Chapter 15 ‘Traffic and Transport’ and based on the following assumptions:

- 50kph vehicle speed on all roads;
- Zero gradient on all roads; and
- Standard bituminous, impervious surface (e.g. hot rolled asphalt) on all roads.

13.2.72 Whilst it is recognised that using the AADT data is a departure from the CRTN methodology, it is considered that this does not have an impact on the assessment as it is the change in noise levels that is being explored and not the absolute noise levels.

13.2.73 One limitation of the CRTN methodology, being based on the $L_{A10,T}$ parameter, is that there is a minimum traffic flow required to generate valid levels. For the 1-hour period, this threshold is 50 vehicles and for the 18-hour period is 1,000 vehicles.

13.2.74 The assessment criteria used for operational road traffic noise are set out below.
### Table 13.6: Impact Significance for Operational Road Traffic Noise (Short Term), dB(A)

<table>
<thead>
<tr>
<th>Change or Difference</th>
<th>Noise Level, dB(A)</th>
<th>Scale of Effect Significance</th>
<th>Significance of Noise Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase or positive difference</td>
<td>5.0 or more</td>
<td>Major negative</td>
<td>Significant</td>
</tr>
<tr>
<td></td>
<td>3.0 – 4.9</td>
<td>Moderate negative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.0 – 2.9</td>
<td>Minor negative</td>
<td></td>
</tr>
<tr>
<td>None/Negligible</td>
<td>0 – 0.9</td>
<td>Negligible impact</td>
<td>Insignificant</td>
</tr>
<tr>
<td>Decrease or negative difference</td>
<td>1.0 – 2.9</td>
<td>Minor positive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.0 – 4.9</td>
<td>Moderate positive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.0 or more</td>
<td>Major positive</td>
<td>Significant</td>
</tr>
</tbody>
</table>

### Football Match Noise

13.2.75 The existing noise sensitive residential areas around the site already experience the noise from the existing stadium and have done so for many years. The noise assessment for the extant permission (HGY/2010/1000) detailed predicted noise levels from the stadium, as proposed at that time. The stadium noise assessment presented in this chapter assesses noise levels from the proposed stadium against the existing stadium noise (as measured in November 2008) and the predicted stadium noise levels set out in the extant permission (i.e. the extant permission forms the baseline scenario). The November 2008 noise levels were gathered during the match with Liverpool with an attendance of 33,242 (92% of current capacity). The character of the new stadium is essentially very similar to that of the existing one and that approved under the extant permission being totally enclosed around the perimeter and although larger, it is a more substantial structure and so would be expected to provide a generally improved sound reduction performance with respect to noise break-out.

13.2.76 Because the nature of much of the noise from the football stadium is intermittent and may vary quite suddenly from being inaudible to the sound of the crowd cheering a goal, the approach adopted has been for the assessment of crowd noise to be undertaken using measurement data taken over very short periods, typically 30 seconds. This time period encompasses most of the significant occurrences of crowd noise, for example when a goal has been scored. The use of longer time periods such as 16 hours (0700 to 2300 hours) as used under different circumstances for proposed residential development, or shorter periods such as 1 hour or 15 minutes as specified for assessments using BS 4142:2014, tends to render short duration events insignificant and provide no clear indication of how crowd noise might interfere with residential amenity.

13.2.77 However, Vanguardia has taken a different approach in its calculations and provided predicted noise levels for the entire duration of the football match including the pre-match announcements, pre-match music, crowd noise and half-time entertainment. An event level has been provided over a 2 hour and 45 minute period. This method, in combination with the assessment over the shorter duration (as detailed above) is considered a robust approach.

13.2.78 The changes in match day noise levels have been considered in terms of the potential uplift in ambient ($L_{Aeq}$) levels using the assessment criteria as have been set out for road traffic noise in Table 13.6 above.

### Non-Football Match Stadium Event Noise

13.2.79 Large events involving high powered amplification are regularly held in sporting stadia, arenas, open air sites and within lightweight buildings all over the UK. In this instance the events are likely to include up to six music concerts and up to ten major sporting events of which at least two will be National Football...
League (NFL) games (i.e. American football).

13.2.80 Use of the football stadium for events on the pitch would be confined to the daytime/evening period, thereby avoiding the night period (23:00 to 07:00) which covers the times when the general adult population are preparing for sleep or are actually sleeping. The assessment has been made on the basis that the proposals for the new stadium follow such a pattern of use.

13.2.81 Noise break-out from the non-football events within the stadium will depend upon a number of factors but of particular significance can be the placement of the stage and the orientation of the loudspeaker systems in relation to that. For this reason detailed acoustic modelling has been carried out by Vanguardia using the IMMI industry standard environmental software in order to predict the noise levels from such events.

13.2.82 The model takes account of ground effect, natural and architectural barriers, spherical spreading and air absorption. The model assumes mild downwind propagation although variations in wind velocity and direction may affect the sound propagation.

13.2.83 Generally noise levels of about $L_{Aeq,T}$ 96 dB measured at the concert mixer position (typically about 40m from the main loudspeakers and at a height of 2.5m) are regarded as the minimum for a concert audience to be entertained. The WHO Guidelines (see Appendix 13.2) recommend a maximum $L_{Aeq,4h}$ of 100 dB.

13.2.84 For musical events such as classical or pop concerts that might be held within the stadium, the Noise Council’s Code of Practice on Environmental Noise Control at Concerts (1995) is the most appropriate source of guidance for noise, at least as far as the level at sensitive premises is concerned. This guidance is currently under review but is considered applicable. The guidance is in terms of absolute noise criteria (see Appendix 13.2) and the assessment of concert noise has been made against these rather than on a graduated scale of impact. Recent stadia have set a precedent for more concerts per year than would typically be allowed under the Code. For example, the Olympic stadium has permission for the 2014/2015 season for six concerts per year including one on a Sunday and one on a bank holiday.

13.2.85 The stadium would fall within the “urban stadia or arenas” category and has been assessed against the relevant criteria for that as set out in the Code. Assuming that events will conclude by 23:00 hours and that there will be six per year, the relevant guideline from the Code of Practice suggests that the music noise level (MNL) should not exceed the background noise level by more than 15 dB(A) over a 15 minute period whereas for 1 to 3 events, an absolute level 75 dB(A) over a 15 minute period is proposed. These noise levels apply at a point one meter from the façade of noise sensitive premises. However, it is only a guide based on best practice at the time of publication. The limits are not prescriptive and where arrangements are satisfactory, venues may continue with limit levels which are higher or lower.

13.2.86 The noise condition relating to the $L_{Aeq}$ measured over a 15 minute time period is based on the guidance within Table 1 of the existing Code of Practice. This document is over 10 years old and, as stated above, is currently under review.

13.2.87 Although based on best practice at that time, research (Proc IOA Vol. 28. Pt.7 2006; Griffiths and Staunton) suggests that Table 1 of the Code would benefit from further refinements; in particular, noise levels, number of concerts and category. One of the issues that has been raised is the step change from 3 to 4 concerts per year which in many cases means a reduction in permitted music noise level of at least
10 dB depending upon the prevailing baseline level. In practice, this change is rarely achievable for many venues. It is unlikely that the increase in concerts by one reflects the change in community response that warrants a change of 10 dB.

13.2.88 Considering the measured baseline data (see Appendix 13.4) the step change in noise levels based upon the prevailing baseline level for four events compared with the absolute level recommended in the guidance for three events is a substantial reduction.

13.2.89 The existing baseline A-weighted $L_{eq,16h}$ values measured in the area indicate that most locations surrounding the proposed Stadium already experience noise levels above the music noise level recommended by the Code for more than 3 events.

Table 13. 7: Comparison of Recommended Music Noise Levels Based on Current Guidance

<table>
<thead>
<tr>
<th>Location*</th>
<th>Existing $L_{A90}$</th>
<th>$L_{A90+15dB}$ (&gt;3 events)</th>
<th>Absolute Level (&lt;4 events)</th>
<th>Difference</th>
<th>Existing $L_{Aeq16h}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>54 dB</td>
<td>69 dB</td>
<td>75 dB</td>
<td>-6 dB</td>
<td>64 dB</td>
</tr>
<tr>
<td>P3</td>
<td>45 dB</td>
<td>60 dB</td>
<td>75 dB</td>
<td>-15 dB</td>
<td>67 dB</td>
</tr>
<tr>
<td>P4</td>
<td>51 dB</td>
<td>66 dB</td>
<td>75 dB</td>
<td>-9 dB</td>
<td>64 dB</td>
</tr>
<tr>
<td>P5</td>
<td>41 dB</td>
<td>56 dB</td>
<td>75 dB</td>
<td>-19 dB</td>
<td>50 dB</td>
</tr>
</tbody>
</table>

*see Appendix13.3 for locations

13.2.90 Research which studied the relationship between the noise level, location of events, number of events and community response based on complaints demonstrated that higher noise limits can be adopted without causing unacceptable disturbance. Examples of this are the concerts that used to be held at Maine Road, Manchester, where environmental levels were in excess of 80 dB $L_{Aeq}$ and Lancashire Cricket Ground where the agreed premises licence condition is 80 dB $L_{Aeq,15m}$ for the nearest residential premises with 75 dB $L_{Aeq,15m}$ for premises further from the ground. The City of Manchester Stadium has an off-site limit of 75 dB $L_{Aeq,15m}$ which is supplemented by a front of house limit of 104 dB(A) averaged over a 10 minute period and Coventry Ricoh which now also has an off-site limit of 75 dB $L_{Aeq}$ for up to 5 concerts per year. As mentioned above, the Queen Elizabeth Olympic Park has secured planning permission for the 2014 to 2015 concert season for up to six concerts with an off-site noise limit of 75 dB(A). Any additional concerts are subject to a noise limit that does not exceed the background noise level +15 dB.

13.2.91 A criterion of 75 dB $L_{Aeq,15min}$ has been used for concerts and a criterion of 75 dB $L_{Aeq,event}$ has been used for the major sporting events. The criterion of 75 dB $L_{Aeq,T}$ is stated in the Code of Practice on Environmental Noise Control at Concerts. The noise during major sporting events is likely to be different than during a football match, both in terms of the level and possibly, at times, the characteristics (for example more frequent use of the public address system and more music). As such, it is considered that major sporting events should be assessed differently to football matches, the noise from which will be familiar to the existing residents in the area. As these events will be sporadic throughout the year, much like the concerts, it is considered appropriate to assign the assessment criterion of 75 dB $L_{Aeq,T}$ with the time period (T) being the duration of the event.

Operational Noise from Fixed Plant

13.2.92 BS 4142:2014 Methods for rating and assessing industrial and commercial sound describes methods for rating and assessing the following:
• sound from industrial and manufacturing processes;
• sound from fixed installations which comprise mechanical and electrical plant and equipment;
• sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
• sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

13.2.93 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes and upon which sound is incident.

13.2.94 Sound from any plant associated with the Project should be considered in accordance with the requirements of BS 4142:2014 and for both existing and proposed noise-sensitive receptors.

13.2.95 The Standard effectively compares and rates the difference between the specific sound level of the source \( L_{\text{Aeq,T}} \) and the typical background sound level \( L_{\text{A90,T}} \) in the absence of the specific sound. If appropriate, the specific sound level is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a ‘rating’ level \( L_{\text{Ar,Tr}} \).

13.2.96 The 2014 version of the standard allows the following additive corrections for character: 0 dB to +6 dB for tonality and 0 dB to +9 dB for impulsivity. Where the specific sound features characteristics that are neither tonal nor impulsive, but otherwise are readily distinctive, a penalty of +3 dB can be applied. Finally, should the specific sound contain identifiable on/off conditions and so be readily distinctive, a penalty of +3 dB can be applied.

13.2.97 The Standard advises that the time interval of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future. The specific sound level should be evaluated over a one hour period during the day and over a 15 minute period during the night.

13.2.98 Comparing the rating level with the background sound level, BS 4142 states:

- "Typically, the greater this difference, the greater the magnitude of impact
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

13.2.99 It is assumed that providing the cumulative effect from all building services plant on site can be designed to meet a rating level that is equal to the existing background noise level(s), at worst only negligible residual effects would remain.
Site Suitability for Noise-sensitive Uses

13.2.100 The road traffic noise levels measured during the baseline noise survey have been used to undertake an assessment of the site’s suitability for residential development. In addition, the conclusions of the operational road traffic noise assessment have been considered to determine the potential uplift in noise levels on the surrounding roads due to the Project.

13.2.101 The site suitability assessment has been undertaken in accordance with the criteria in British Standard 8233 and the World Health Organisation’s Guidelines for Community Noise (see Appendix 13.2).

Cumulative Assessment

13.2.102 The cumulative assessment has considered the following schemes in the area in terms of operational road traffic noise:

- Image House, Station Road, N17 9LR. A 96 bed hotel (low car use).
- 5 Bruce Grove, N17 6RA. Four apartments and ten houses (low car use)
- Vacant land between 17 and 34 Pretoria Road, N17 8DX. Extra care facility of 52 units (low car use).

13.2.103 Other developments in the area are either at a significant distance, are operational and have been included in the 2015 traffic survey and are, therefore accounted for, or are small in scale such that they would not be of influence.

13.2.104 The Goods Yard is a construction compound for which planning permission is yet to be determined. If planning permission is granted, it will provide concrete batching facilities, aggregate washing and a storage area for the main stadium.

Geographical Scope

13.2.105 The extent of the study area includes the site itself and sensitive receptors beyond the site boundary. The extent of the study area beyond the site boundary is defined by the proximity of the noise-sensitive uses to the site. There are existing noise-sensitive receptors close to the site, as set out below:

- Worcester Road;
- Schools on Worcester Road;
- Park Lane; and
- High Road.

13.2.106 The road traffic noise effects associated with the Project are considered on a wider geographic scale.

Assumptions and Limitations

13.2.107 It has been necessary to make various assumptions as detailed throughout this report. A summary of the assumptions is set out below.
Construction Phase

13.2.108 As is usual at this stage of a development, the exact details regarding the construction phase plant and type, their locations etc are unknown. Generic calculations have been undertaken based on experience of similar sites. However, these calculations provide only an indication of the likely noise and vibration levels that may be generated.

13.2.109 A detailed assessment should be undertaken once contractors are on board to determine the noise and vibration levels that will be generated and any necessary mitigation measures.

Operational Road Traffic Noise

13.2.110 The likely difference in road traffic noise comparing various scenarios has been predicted using the Basic Noise Level (L\textsubscript{A10,18hour}) at 10 metres from the nearside kerb as defined in the CRTN. The predictions incorporate the AADT vehicle flows and the proportion of heavy vehicles, as provided by Tim Spencer & Co, along with the following assumptions:

- 50kph vehicle speed on all roads;
- Zero gradient on all roads; and
- Standard bituminous, impervious surface (e.g. hot rolled asphalt) on all roads.

13.2.111 One limitation of the CRTN methodology is that with the L\textsubscript{A10,T} being a statistical parameter, there is a minimum traffic flow required to generate valid levels. For the 18-hour period, this threshold is 1,000 vehicles. Where the vehicle flow is between 1,000 and 4,000 a low flow correction has been added in accordance with the CRTN methodology. Where flows are below this level (as is the case for some of the road links considered) no prediction has been made, although it would be reasonable to assume in such instances that road traffic noise would not be particularly significant.

Operational Noise from Fixed Plant

13.2.112 At this stage in the scheme design, no information regarding the proposed plant types and locations has been assessed – this will be determined during the detailed design stages. As a consequence, it is not possible to undertake meaningful predictions to determine the significance of the likely noise effect, so instead noise emission limits have been set that apply to activities covered by BS 4142, including external fixed plant.

13.2.113 Vanguardia Consulting is providing detailed design advice and, where necessary, will be specifying mitigation measures to achieve the recommended noise emission limits.

Baseline Conditions

13.3 Baseline Conditions

13.3.1 The hourly measurement results are presented in Appendix 13.5. A summary of the results for each of the five unattended, continuous monitoring sites is given in the following table.
Table 13. 8: Summary of Unattended Free-field Noise Measurements (in dB)

<table>
<thead>
<tr>
<th>Starting Date</th>
<th>Location P1 (Park Lane at south west corner of stadium opposite Concorde House)</th>
<th>Location P2 (748 High Road front façade)</th>
<th>Location P3 (Forecourt of Unit 9, 12-48 Northumberland Park opposite 38 Northumberland Park)</th>
<th>Location P4 (41 Worcester Avenue, front façade)</th>
<th>Location P5 (17 Worcester Avenue, rear façade)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L&lt;sub&gt;AEq&lt;/sub&gt; 16h (07:00 to 23:00)</td>
<td>L&lt;sub&gt;AEq&lt;/sub&gt; 8h (23:00 to 07:00)</td>
<td>Lowest L&lt;sub&gt;A90&lt;/sub&gt; 1h (07:00 to 23:00)</td>
<td>Lowest L&lt;sub&gt;A90&lt;/sub&gt; 1h (23:00 to 07:00)</td>
<td>Lowest L&lt;sub&gt;A90.5m&lt;/sub&gt; (23:00 to 07:00)</td>
</tr>
<tr>
<td>Tuesday 11 November 2008</td>
<td>61.7*</td>
<td>58.2</td>
<td>54.7*</td>
<td>51.9</td>
<td>51.6</td>
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<td>Wednesday 12 November 2008</td>
<td>65.6</td>
<td>61.2</td>
<td>56.7</td>
<td>56.6</td>
<td>56.5</td>
</tr>
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<td>58.4</td>
<td>54.9</td>
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<td>52.3</td>
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<tr>
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<td>61.3</td>
<td>55.3</td>
<td>52.9</td>
<td>52.4</td>
</tr>
<tr>
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<td>59.8</td>
<td>53.8</td>
<td>52.6</td>
<td>52.3</td>
</tr>
<tr>
<td>Sunday 16 November 2008</td>
<td>63.0</td>
<td>58.5</td>
<td>53.1</td>
<td>52.6</td>
<td>52.3</td>
</tr>
<tr>
<td>Monday 17 November 2008</td>
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<td>55.1*</td>
<td>-</td>
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<td>70.7</td>
<td>58.2*</td>
<td>45.2</td>
<td>40.4</td>
</tr>
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<td>70.8</td>
<td>60.0</td>
<td>45.9</td>
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<td>54.3</td>
<td>45.7</td>
<td>42.7</td>
</tr>
<tr>
<td>Monday 17 November 2008</td>
<td>74.8*</td>
<td>-</td>
<td>59.3*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tuesday 11 November 2008</td>
<td>67.7*</td>
<td>-</td>
<td>51.6*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wednesday 19 November 2008</td>
<td>68.2†</td>
<td>62.6</td>
<td>47.7†</td>
<td>41.2</td>
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<td>40.1</td>
<td>38.8</td>
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<td>42.0</td>
<td>40.6</td>
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<td>61.7</td>
<td>45.8</td>
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<td>64.9</td>
<td>60.7</td>
<td>42.4</td>
<td>40.1</td>
<td>38.4</td>
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<tr>
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<td>66.6†</td>
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<td>50.6†</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Tuesday 11 November 2008</td>
<td>55.6</td>
<td>55.7</td>
<td>51.5</td>
<td>50.3</td>
<td>48.7</td>
</tr>
<tr>
<td>Wednesday 12 November 2008</td>
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<td>56.1</td>
<td>52.7</td>
<td>50.4</td>
<td>49.4</td>
</tr>
<tr>
<td>Thursday 13 November 2008</td>
<td>57.8</td>
<td>52.4</td>
<td>51.5</td>
<td>50.6</td>
<td>49.3</td>
</tr>
<tr>
<td>Friday 14 November 2008</td>
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<td>59.6</td>
<td>51.6</td>
<td>50.7</td>
<td>48.8</td>
</tr>
<tr>
<td>Saturday 15 November 2008</td>
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<td>57.7</td>
<td>51.6</td>
<td>50.5</td>
<td>48.9</td>
</tr>
<tr>
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<td>56.8</td>
<td>53.1</td>
<td>50.8</td>
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<td>49.6</td>
</tr>
<tr>
<td>Monday 17 November 2008</td>
<td>56.8</td>
<td>-</td>
<td>52.6</td>
<td>-</td>
<td>-</td>
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<tr>
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<td>46.0</td>
<td>41.9</td>
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<td>38.3</td>
</tr>
<tr>
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<td>43.0</td>
<td>38.1</td>
<td>37.4</td>
</tr>
<tr>
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<td>48.7</td>
<td>40.9</td>
<td>41.5</td>
<td>40.2</td>
</tr>
<tr>
<td>Monday 17 November 2008</td>
<td>53.6</td>
<td>-</td>
<td>48.1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes:  
* The daytime (07:00 to 23:00) data for Tuesday 11 November and Monday 17 November 2008 are only for 5 hours and 2 hours periods respectively.  
† The daytime (07:00 to 23:00) data for Wednesday 19 November and Monday 24 November 2008 are only for 5 hour and 7 hour periods respectively.
13.3.2 The dominant influence on all of the long term unattended measurement locations was road traffic noise although at several locations background noise levels were determined by the noise of fixed plant at the existing stadium or other commercial/industrial sources in the vicinity of a particular location.

13.3.3 At location P1, on the flat roof of the building at the southwest corner of the stadium, whilst noise from fans on that corner of the stadium and from the pitch heating plant exhaust trunking on the roof of the building used were apparent at the time of installation it was anticipated that these would not be running constantly. In fact, it appears that the plant did operate intermittently but judged by the constancy of the lowest $L_{A90,1h}$ and $L_{A90,5m}$ background noise levels recorded in Table 13.8 there may always have been at least one item running by day and by night. The ambient noise levels measured were always well above the background $L_{A90,1h}$ but for those $L_{Aeq,T}$ that were within 10dB of the background noise level there will have been a contribution to the ambient noise level from that fixed plant. For that reason and to ensure that the site suitability assessment is accurate, an attended measurement of three consecutive $L_{Aeq,1h}$ (the shortened measurement procedure of CRTN) was made on Park Lane at a location screened from the stadium plant noise. Table 13.9 presents the results of that measurement and the $L_{Aeq,16h}$ that was derived from these using the procedures set out in CRTN and the Transport Research Laboratory (TRL) Document *Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping*.

Table 13.9: Summary of Attended CRTN Measurements below Location P1 on Park Lane

<table>
<thead>
<tr>
<th>Time Period</th>
<th>$L_{A10,T}$ (dB)</th>
<th>$L_{Aeq,1h}$ (dB)</th>
<th>$L_{A90,1h}$ (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:00 – 15:00</td>
<td>65.2</td>
<td>62.6</td>
<td>53.3</td>
</tr>
<tr>
<td>15:00 – 16:00*</td>
<td>67.2</td>
<td>68.9*</td>
<td>53.4</td>
</tr>
<tr>
<td>16:00 – 17:00</td>
<td>67.2</td>
<td>65.7</td>
<td>52.4</td>
</tr>
<tr>
<td>Arithmetic mean of $L_{A10,1h}$</td>
<td>66.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conversion to $L_{A10,18h}$</td>
<td>65.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conversion to $L_{Aeq,16h}$</td>
<td>63.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: The $L_{A10,18h}$ is calculated in accordance with the shortened measurement procedure of CRTN as the arithmetic mean of the three $L_{A10,1h}$ measured during the survey on Park Lane -1dB. That figure is then converted to an $L_{Aeq,16h}$ using the conversions in the TRL document.

* The $L_{Aeq,1h}$ between 15:00 and 16:00 was influenced by the noise of passing school children.

13.3.4 The calculated $L_{Aeq,16h}$ noise level in Table 13.9 agrees very closely with those measured on the weekdays at location P1 and demonstrates that these are reliable for use in the site suitability assessment.

13.3.5 Location P2 was located overlooking High Road and the noise levels there were very consistent from day to day, as is to be expected with a heavily trafficked road.

13.3.6 Measurements at location P3 were disrupted by a cable fault which was not discovered until the equipment was retrieved on 17 November 2008. The repeat survey conducted between Wednesday 19 November and Monday 24 November 2008 again showed the consistency to be expected of ambient noise dominated by road traffic. The background noise levels at this location, being further from High Road than locations P1 and P2, were significantly lower than at either of those.

13.3.7 The results for location P4 in Table 13.8 demonstrate the effect on the $L_{A90,T}$ background noise levels there of constant fan noise from the north stand of the existing stadium. The atypical $L_{Aeq,16h}$ result for Friday 14 November 2008 was influenced by two very high noise level events of unknown origin occurring.
between 10:41 and 10:46 (L_{Aeq,280s} of 93.7 dB) and the second event between 12:57 and 13:10 (L_{Aeq,760s} of 81.4 dB). Both events appear to have been very local to the microphone position as they are not present in the time histories of the other locations. The data gathered on Friday 14th November 2008 at P4 have, therefore, not been used further in this assessment.

13.3.8 Location P5 was used as a proxy for the rear of Worcester Avenue houses in the area. Consequently these are some of the lowest ambient and background noise levels recorded during the survey. This is to be expected for a situation in which road traffic noise from Northumberland Park is partially screened by properties on the south side of that road and there is screening by the terrace from plant noise from the stadium and commercial/industrial areas to the west and south west.

13.3.9 Results from the two sound level meters installed within the stadium during the match on 12 November 2008 are described in detail in Appendix 13.6. A significant point to note from those is that there is a clear difference between the noise level at the two positions when the goal scored is by the visiting team (the fourth and sixth goals) where the measured level at the mid-tier location in the west stand (S7) was approximately 9 dB less than at the south west corner (S6). Except for lulls during the interval and the cheers for full time, the noise levels at the southwest corner location were invariably higher than at the mid-tier location in the west stand.

13.3.10 The remaining measurement locations were used for attended measurements of relatively short duration outside the stadium during the match. A commentary on these is provided in the tabulated results at Appendices 13.7 and 13.8. It is noteworthy that the difference between results following a goal measured close to the stadium and further away at 41 Worcester Avenue is only about 3 dB (e.g. the difference between locations R17 and P4 for the first and second goals) or 6 dB taking into account the fact that the latter position was 1m in front of a reflective façade. An analysis of this is provided in Appendix 13.9 with further numerical analysis of the remaining five goals.

13.3.11 Measurement location R11 in front of 30 Park Lane (approximately 20m from the south stand) was where the highest noise level immediately following a goal was recorded. The free-field noise level measured there was 75.8 dB L_{Aeq,30s} for a home team goal. The next highest level following a goal was measured at location R12, another free-field measurement made on the south side of Park Lane in the junction with Lancaster Close. The noise level at that position was 74.7 dB L_{Aeq,30s} for an away team goal. At 41 Worcester Park (location P4) the same home team goal was measured at 66.3 dB L_{Aeq,30s}.

13.3.12 The sixth goal measured simultaneously at the location in front of 16 Bromley Road (location R10) and at 41 Worcester Avenue (location P4) is 1.4 dB less at the Bromley Road location than at the Worcester Road one, or 1.6 dB more if allowance is made for the latter being a façade level measurement. The distance of the 16 Bromley Road location from the south stand, at 105m, is the same as the minimum distance between 41 Worcester Avenue and the north stand although the latter has a more direct and open view of the stadium.

13.3.13 Ordinarily one might expect the noise level to reduce at a rate of 6 dB per doubling of distance but in this case there are two particular factors that tend to reduce the decay rate of sound arising within the stadium as the distance from it increases. The stadium structure is so large that for crowd noise at least, it is likely to be behaving as a plane source (see Appendix 13.1) and therefore the measurements in the near vicinity are within the near field where the decay rate with distance will be less. Additionally there is likely to be some effect from sound breakout through the opening in the roof of the stadium above the pitch.
which will be more significant for receptors at a distance from the stadium where they might have a line of sight to the top of the stadium roof.

13.3.14 In the case of the noise of spectators making their way to and from the stadium on foot, the noise source grows and declines fairly steadily over periods typically of the order of 45 minutes for the arrival and 15 minutes for the dispersal of pedestrians using the main routes to the public transport links. This is based upon the noise measurement time histories and direct observations of spectators leaving the evening match at White Hart Lane on 12 November 2008. An exception to this was on Park Road in the vicinity of the away supporters entrances to the south stand where entry to and exit from the stadium was much slower than for home supporters in other stands. There the pre-match build up was more like 1 hour 15 minutes and the dispersal a period of 30 minutes.

13.4 Inherent Design Mitigation

13.4.1 Vanguardia Consulting has been commissioned to undertake the acoustic detailed design work for the stadium. Its RIBA Stage E report has built the following design mitigation measures into the stadium design:

- Stadium roof envelope to achieve a minimum sound insulation of 30 dB $R_W$ with the polycarbonate section providing a minimum sound insulation of 20 dB $R_W$.
- Enclosure of the upper bowl – relevant sections of the glazed curtain walling to provide sound insulation of 30 dB $R_W$.
- Enclosing the upper tier to the south of the stadium so that there are no gaps around the upper edge of the stadium and the continuation of the roof shall connect to the vertical bowl façade. Minimum sound insulation of the stadium façade should be 20 dB $R_W$ excluding areas of corporate activities (see below).
- Minimum sound insulation for glazing for corporate and conference areas on Levels 02, 03, 04 and 09 are set out below:
  - Level 02 boxes – 39 dB $R_W$
  - Level 03 corporate – 39 dB $R_W$
  - Level 04 boxes – 39 dB $R_W$
  - Level 04 control room – 45 dB $R_W$
  - Level 04 studios – 45 dB $R_W$
  - Level 09 Sky lounges – 39 dB $R_W$
  - Level 09 Sky bridge – 50 dB $R_W$

13.5 Potential Environmental Impacts and Effects

13.5.1 In accordance with the noise and vibration section of the scoping report informally submitted to Haringey Council, this chapter of the ES considers effects during the construction and operational stages of the Project, as detailed below.

- the noise and vibration effects during the construction phase on existing sensitive receptors close to the Project;
- the effects of operational road traffic noise on the existing road network;
- the effects of match day noise levels on the existing receptors close to the site;
- the effects of non-football event noise levels on the existing receptors close to the site; and
the noise effects of the proposed external fixed plant items on existing receptors close to the site insofar as setting a cumulative noise emission limit for external plant for use at the detailed design stage.

13.5.2 The assessment of the suitability of the site for residential development has been undertaken separately and is set out in Section 13.8 below.

Construction

Noise

13.5.3 It is inevitable with any development that there will be some disturbance caused to those nearby during the site clearance and construction phases. However, disruption due to construction is a localised phenomenon and temporary in nature. In general, only people living within approximately 100m of the site are likely to be significantly affected by construction noise.

13.5.4 The techniques available to predict the likely noise and vibration effects from site preparation and construction operations, such as those contained within BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 respectively (see Appendix 13.2), necessarily are based on quite detailed information on the type and number of plant being used, their location and the length of time they are in operation. Although such detail is not available at this stage of the development process, an estimate of the likely effects of noise and vibration from the site clearance and construction phases has been made for those receptors closest to each key area of work.

13.5.5 The predictions, based on generic plant and WSP’s experience of similar developments and using the methodology contained within BS 5228, are in terms of the $L_{Aeq,T}$ noise level over the core working day. The predictions are a ‘worst case’ in that it is assumed that any mitigation measures (such as those identified later in this chapter e.g. Goods Yard) have not been implemented. Both ‘worst case’ and ‘average case’ scenarios have been considered assuming that the works are being undertaken at the closest point of the relevant area of the site to each receptor, and at the mid point of the area of works, respectively.

13.5.6 The construction programme assumes a 12 hour working day and a seven day working week. If the construction programme follows Haringey Council’s standard construction hours (Monday to Friday 08:00 to 18:00 hours and Saturday 08:00 to 13:00 hours) the programme will be extended by one year.

13.5.7 Table 13.10 below sets out the approximate programme considering a 12 hour working day and a seven day working week.

Table 13.10: Approximate Phasing of Construction Works

<table>
<thead>
<tr>
<th>Stage</th>
<th>Works</th>
<th>Anticipated Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1 – Stadium Phase (A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1a</td>
<td>Ground excavation and remediation</td>
<td>September 2015 to October 2015</td>
</tr>
<tr>
<td>1b</td>
<td>Piling</td>
<td>March 2015 to February 2016</td>
</tr>
<tr>
<td>1c</td>
<td>Stadium construction (northern section) and north-east building</td>
<td>March 2016 to February 2018</td>
</tr>
<tr>
<td>1d</td>
<td>Demolition of existing stadium</td>
<td>May 2017 to October 2017</td>
</tr>
<tr>
<td>Phase 2 – Stadium Phase (B)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2a  Ground excavation and remediation  May 2017 to September 2017
2b  Piling  June 2017 to October 2017
2c  Stadium construction (southern section)  May 2017 to August 2018

Phase 3 – Mixed-use Phase

3a  Ground excavation and remediation  May 2017 to January 2019
3b  Piling  August 2018 to July 2019
3c  Construction of hotel, THFC experience and residential  January 2018 to 2022

13.5.8 The expected plant and associated sound power levels assumed for the predictions are given in the table below along with the reference to the origin of this source information from Annexes C and D of BS 5228-1:2009+A1:2014.
### Table 13.11: Construction Plant Noise Levels

<table>
<thead>
<tr>
<th>Plant</th>
<th>Data Source</th>
<th>$L_{WA}$ (dB) (each item)</th>
<th>% On Time of 10-Hour Day (each item)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase 1d – Demolition</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 no. 360º excavators</td>
<td>BS 5228 - D.3/40</td>
<td>108</td>
<td>80</td>
</tr>
<tr>
<td>1 no. breaker mounted on excavator</td>
<td>BS 5228 - C.1/3</td>
<td>108</td>
<td>60</td>
</tr>
<tr>
<td>2 no. tracked crushers</td>
<td>BS 5228 - C.1/15</td>
<td>112</td>
<td>70</td>
</tr>
<tr>
<td>1 no. roller</td>
<td>BS 5228 - C.2/37</td>
<td>107</td>
<td>10</td>
</tr>
<tr>
<td>1 no. dozer</td>
<td>BS 5228 - C.2/10</td>
<td>108</td>
<td>70</td>
</tr>
<tr>
<td>20 no. lorries removing material</td>
<td>BS 5228 - C.2/34</td>
<td>108</td>
<td>2</td>
</tr>
<tr>
<td><strong>Phases 1a, 2a and 3a – Site Preparation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 no. 360º excavators</td>
<td>BS 5228 - D.3/40</td>
<td>108</td>
<td>70</td>
</tr>
<tr>
<td>2 no. dumper lorries tipping</td>
<td>BS 5228 - C.2/30</td>
<td>107</td>
<td>50</td>
</tr>
<tr>
<td>1 no. grader</td>
<td>BS 5228 - D.3/75</td>
<td>112</td>
<td>10</td>
</tr>
<tr>
<td>1 no. roller</td>
<td>BS 5228 - C.2/37</td>
<td>107</td>
<td>10</td>
</tr>
<tr>
<td><strong>Phases 1b, 2b and 3b – Piling/Foundation Works</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 no. auger piling rigs</td>
<td>BS 5228 - C.3/21</td>
<td>107</td>
<td>50</td>
</tr>
<tr>
<td>2 no. 360º excavators</td>
<td>BS 5228 - D.3/40</td>
<td>108</td>
<td>50</td>
</tr>
<tr>
<td>1 no. dumper lorry tipping</td>
<td>BS 5228 - C.2/30</td>
<td>107</td>
<td>10</td>
</tr>
<tr>
<td>1 no. concrete mixer truck discharging</td>
<td>BS 5228 - C.4/18</td>
<td>103</td>
<td>10</td>
</tr>
<tr>
<td>1 no. concrete batching plant</td>
<td>BS 5228 – D6.10</td>
<td>106</td>
<td>50</td>
</tr>
<tr>
<td><strong>Phases 1c, 2c and 3c – Construction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 no. tower crane</td>
<td>BS 5228 - C.4/48</td>
<td>104</td>
<td>30</td>
</tr>
<tr>
<td>1 no. concrete mixer truck idling</td>
<td>BS 5228 - C.4/19</td>
<td>99</td>
<td>10</td>
</tr>
<tr>
<td>1 no. concrete mixer + concrete pump</td>
<td>BS 5228 - C.4/32</td>
<td>106</td>
<td>30</td>
</tr>
<tr>
<td>2 no. forklift trucks</td>
<td>BS 5228 - D.7/93</td>
<td>104</td>
<td>30</td>
</tr>
<tr>
<td>20 no. hammering</td>
<td>BS 5228 - D.7/80</td>
<td>107</td>
<td>2</td>
</tr>
<tr>
<td>1 no. scaffolding erection/dismantling</td>
<td>BS 5228 - D.7/1</td>
<td>108</td>
<td>20</td>
</tr>
<tr>
<td>10 no. lorries delivering materials</td>
<td>BS 5228 - C.2/34</td>
<td>108</td>
<td>2</td>
</tr>
</tbody>
</table>

**Notes:** BS 5228 data from Annexes C and D to BS 5228-1:2009+A1:2014.

"% On-Time" is the percentage of the working day over which the plant is assumed to be operating.

13.5.9 For the purpose of these predictions, it is assumed that the intervening ground between the construction noise sources and the noise-sensitive properties, for both the ‘worst case’ and ‘average case’ scenarios, will be acoustically hard such that there is no significant attenuation of sound due to ground absorption.

13.5.10 The predictions are undertaken for the following groups of noise-sensitive receptors:
- Worcester Road (No. 41 used as the closest existing dwellings to the works);
- Schools on Worcester Road (in each instance the school closest to each phase has been assessed);
- Park Lane (no. 32 used as the closest existing dwelling to the works); and
- High Road (No. 741 used as the closest existing dwelling to the works).

Based on the programme, activities and plant described above, the predicted noise levels are given in Table 13.12 (worst case) and Table 13.13 (average case).

<table>
<thead>
<tr>
<th>Location of Nearest Receptors</th>
<th>Activity</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worcester Avenue (dwellings)</td>
<td>Demolition</td>
<td>71</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Site Prep</td>
<td>73</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Piling and foundations</td>
<td>72</td>
<td>64</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>70</td>
<td>62</td>
<td>57</td>
</tr>
<tr>
<td>Worcester Avenue (schools)</td>
<td>Demolition</td>
<td>81</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Site Prep</td>
<td>74</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Piling and foundations</td>
<td>73</td>
<td>74</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>71</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>Park Lane</td>
<td>Demolition</td>
<td>82</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Site Prep</td>
<td>60</td>
<td>64</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>Piling and foundations</td>
<td>60</td>
<td>64</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>57</td>
<td>62</td>
<td>75</td>
</tr>
<tr>
<td>High Road</td>
<td>Demolition</td>
<td>72</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Site Prep</td>
<td>75</td>
<td>76</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>Piling and foundations</td>
<td>74</td>
<td>76</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>72</td>
<td>73</td>
<td>65</td>
</tr>
</tbody>
</table>

*Time interval (T) is for either a 10 hour working day or a 12 hour working day.
### Table 13.13: Predicted Average Case Construction Noise Levels – Façade $L_{Aeq,T}$, dB

<table>
<thead>
<tr>
<th>Location of Nearest Receptors</th>
<th>Activity</th>
<th>*Predicted Noise Level, dB $L_{Aeq,T}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Phase 1</td>
</tr>
<tr>
<td>Worcester Avenue (dwellings)</td>
<td>Demolition</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Site Prep</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Piling and foundations</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>61</td>
</tr>
<tr>
<td>Worcester Avenue (schools)</td>
<td>Demolition</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Site Prep</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Piling and foundations</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>63</td>
</tr>
<tr>
<td>Park Lane</td>
<td>Demolition</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>Site Prep</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Piling and foundations</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>59</td>
</tr>
<tr>
<td>High Road</td>
<td>Demolition</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Site Prep</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Piling and foundations</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>61</td>
</tr>
</tbody>
</table>

*Time interval (T) is for either a 10 hour working day or a 12 hour working day.

13.5.12 It can be seen from Table 13.12 that the predicted worst case noise levels at some of the nearest properties to the site could exceed 75dB $L_{Aeq,T}$ during the demolition, site preparation and/or piling and foundation phases. In accordance with the criteria adopted for this assessment, as set out at previously, the effect on the associated residents, prior to mitigation, could be significant. During core construction site hours, there is likely to be a direct, temporary negative effect of negligible to major significance on some of the nearest dwellings, prior to the implementation of mitigation measures. If these works were to be undertaken during the extended working hours (Saturday 13:00 to 18:00 hours and Sunday 08:00 to 18:00 hours) there is likely to also be a direct, temporary, negative effect of negligible to major significance.

However,

13.5.13 Table 13.13 demonstrates that the predicted average case noise levels are below the 75dB $L_{Aeq,T}$ limit, indicating that during core construction site hours for the majority of the time there is likely to be no more than a direct, temporary, effect of moderate negative significance, prior to the implementation of mitigation measures. If these works were to be undertaken during the extended working hours there is likely to be a direct, temporary, negative effect of negligible to major significance.

13.5.14 Construction traffic will approach the site from the north via the A406 North Circular and High Road. During the worst-case month of construction, there will be 98 trips made by construction vehicles per day. On these already highly trafficked roads this will result in an increase of approximately 0.2 dB. This will result in a direct, short-term negligible impact.
**Vibration**

13.5.15 For the purposes of calculating the vibration impact from the site preparation and construction works, measurement data have been taken from BS 5228-2:2009+A1:2014 and from measurements undertaken by WSP at other sites. The measurement data obtained from BS 5228-2:2009+A1:2014 relate to augured piling operations, whilst the measurement data obtained by WSP relate also to the use of pneumatic breakers deployed for the removal of concrete hardstanding and the demolition of structures during the preparation of other sites.

13.5.16 The predictions are undertaken for the same receptors as considered in the construction noise predictions. Potentially auger piling could be required, whilst pneumatic breakers are likely to be used during demolition.

13.5.17 The predicted maximum levels of vibration at each of the vibration-sensitive receptors are detailed in Table 13.14. The predicted vibration levels are those that would occur when the works are being undertaken at the closest point to each of the sensitive receptors and, therefore, represent a worst case scenario.

<table>
<thead>
<tr>
<th>Location of Nearest Receptors</th>
<th>Predicted PPV, mm/s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large Pneumatic Breaker</td>
</tr>
<tr>
<td></td>
<td>Demolition</td>
</tr>
<tr>
<td>Worcester Avenue (dwellings)</td>
<td>0.25</td>
</tr>
<tr>
<td>Worcester Avenue (schools)</td>
<td>0.71</td>
</tr>
<tr>
<td>Park Lane</td>
<td>1.25</td>
</tr>
<tr>
<td>High Road</td>
<td>0.25</td>
</tr>
</tbody>
</table>

13.5.18 Comparing the above levels with the criteria presented in Table 13.5 it can be seen that, with the exception of Park Lane during demolition, only a minor negative effect or less on the receptors/occupants has been predicted. At Park Lane a moderate negative effect has been predicted. Therefore as a worst case at Park Lane there will potentially be a direct, temporary, moderate negative effect. At other receptors there will be a direct, temporary negligible to minor negative effect.

13.5.19 However, the above predictions assume that the operations are at the areas of the Project Site closest to the receptors and do not represent the conditions that will prevail for the majority of the works. The activities at the assumed distances are likely to be of a relatively short duration.

13.5.20 Based on the vibration limits presented in Appendix 13.2, the effect of the works on any buildings (as opposed to the occupants) will be negligible, being very much below the lowest levels at which even cosmetic building damage might be expected.

**Occupation**

**Operational Road Traffic Noise**

13.5.21 Using traffic flow data provided for the TA the changes in road traffic noise level on each of the road links modelled for the transport assessment have been predicted as described above.

13.5.22 The results for the change in the Annual Average Daily Traffic (AADT) flows between the baseline year of
2015 and the year 2018 with the Project are summarised in Table 13. 15. The assessment for the baseline year of 2015 and the year 2021 with the Project are summarised in Table 13. 16.

### Table 13. 15: Predicted Changes in Road Traffic Noise BNL between AADT 2015 Baseline and Baseline including 2018 Proposed Development.

<table>
<thead>
<tr>
<th>Link/Description</th>
<th>Change in BNL dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. White Hart Lane, just west of A1010 High Road</td>
<td>0</td>
</tr>
<tr>
<td>2. White Hart Lane, just west of Fenton Road</td>
<td>0</td>
</tr>
<tr>
<td>3. A1010 High Road, just south of White Hart Lane</td>
<td>0</td>
</tr>
<tr>
<td>4. A10 High Road, just south of Bruce Grove</td>
<td>0</td>
</tr>
<tr>
<td>4A. A10 High Road, just south of Monument Way</td>
<td>0</td>
</tr>
<tr>
<td>6. A1010 High Road, just south of Park Lane</td>
<td>0</td>
</tr>
<tr>
<td>7. Northumberland Park, between Worcester Avenue and Bennetts Close - east of Sainsbury</td>
<td>0</td>
</tr>
<tr>
<td>10. A1010 High Road, just south of Brantwood Road</td>
<td>0</td>
</tr>
<tr>
<td>11. A1010 Fore Street, just south of A406</td>
<td>0</td>
</tr>
<tr>
<td>12. Lordship Lane, just west of A1010 High Road</td>
<td>0</td>
</tr>
<tr>
<td>15. White Hart Lane, just east of the A10 Great Cambridge Road</td>
<td>0</td>
</tr>
<tr>
<td>16. Leeside Road, just east of Willoughby Lane</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table 13. 16: Predicted Changes in Road Traffic Noise BNL between AADT 2015 Baseline and Baseline including 2021 Proposed Development

<table>
<thead>
<tr>
<th>Link/Description</th>
<th>Change in BNL dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. White Hart Lane, just west of A1010 High Road</td>
<td>0</td>
</tr>
<tr>
<td>2. White Hart Lane, just west of Fenton Road</td>
<td>0</td>
</tr>
<tr>
<td>3. A1010 High Road, just south of White Hart Lane</td>
<td>+0.1</td>
</tr>
<tr>
<td>4. A10 High Road, just south of Bruce Grove</td>
<td>0</td>
</tr>
<tr>
<td>4A. A10 High Road, just south of Monument Way</td>
<td>0</td>
</tr>
<tr>
<td>6. A1010 High Road, just south of Park Lane</td>
<td>+0.1</td>
</tr>
<tr>
<td>7. Northumberland Park, between Worcester Avenue and Bennetts Close - east of Sainsbury</td>
<td>0</td>
</tr>
<tr>
<td>10. A1010 High Road, just south of Brantwood Road</td>
<td>+0.1</td>
</tr>
<tr>
<td>11. A1010 Fore Street, just south of A406</td>
<td>0</td>
</tr>
<tr>
<td>12. Lordship Lane, just west of A1010 High Road</td>
<td>0</td>
</tr>
<tr>
<td>15. White Hart Lane, just east of the A10 Great Cambridge Road</td>
<td>0</td>
</tr>
<tr>
<td>16. Leeside Road, just east of Willoughby Lane</td>
<td>0</td>
</tr>
</tbody>
</table>

13.5.24 Comparing the changes in road traffic noise levels between the 2015 Baseline and 2018 baseline plus development with the assessment criteria in Table 13. 6 shows that there will be a direct, permanent negligible impact on all road links.

13.5.25 Comparing the changes in road traffic noise levels between the 2015 Baseline and 2021 baseline plus development with the assessment criteria in Table 13. 6 also shows that there will be a direct, permanent...
negligible impact on all road links.

13.5.26 As stated in paragraph 13.2.111, it is not possible to undertake predictions for road links where flows are below the CRTN threshold. This is the case for the following three road links:

- Park Lane, just east of A1010 High Street;
- Worcester Avenue, just north of Park Lane; and
- Worcester Avenue, just south of Northumberland Park.

13.5.27 At Park Lane the AADT flows show that there is an increase in flows between the baseline and 2018 and 2021 scenarios. There is an increase of 45% between the baseline and 2021. However, the flows do not consider the restrictions on car movements to the proposed residential and hotel developments on match-days which will result in a decrease in the impact.

13.5.28 Similarly, at Worcester Road just north of Park Lane there is likely to be an increase in flows between the baseline and 2021 (worst-case) of 132%. For the reasons stated above, it is likely that there will be a reduction in the impact.

13.5.29 For Park Lane and Worcester Road (just north of Park Lane), there is likely to be a direct, permanent, minor negative (insignificant) impact.

13.5.30 There will be no increase in traffic flows on Worcester Avenue south of Northumberland Park. As such, there will be a direct, permanent negligible impact.

**Football Matches**

13.5.31 The capacity of the current White Hart Lane stadium is 36,000 and the capacity of the stadium approved in the extant permission is 56,250. The capacity of the proposed stadium is 61,100. Based simply on the increased number of spectators, the noise that they create within the stadium would be expected to increase by 0.4dB when comparing the proposed development with the extant permission and 2.3dB when comparing the proposed development with the existing stadium. This can be taken as representing the worst case increase in the crowd noise source, the aspect that is most difficult to control other than by means of the stadium structure. A similar assumption can be made for the noise from supporters making their way to the stadium on foot on the major routes between the stations and the ground for which the proportional change in numbers has been assumed to be similar to that of the increase in stadium capacity.

13.5.32 During a typical season there are 26 matches played in the stadium. Additionally it is proposed that there will up to 16 non-football events in the stadium annually and these have been assumed to include up to six concert events for the purpose of assessment under the Noise Council’s Code of Practice on Environmental Noise Control at Concerts (see the following section).

13.5.33 Except for the tunnel at the southeast corner of the existing stadium and the open roof above the pitch, the existing stadium provides a total enclosure of the ground. The southeast corner is a home supporters area and therefore one of the noisiest parts of the existing stadium. The tunnel provides a direct line of sight from Park Lane into the stadium although not to the pitch itself.

13.5.34 The proposed new stadium will provide a complete bowl around the pitch but with its centre relocated
approximately 110m to the north of the existing stadium. This will place it further from properties to the south where existing houses on the south side of Park Lane for example are currently within approximately 20m of the south stand but would be approximately 100m from the closest point of the proposed stadium.

13.5.35 As far as effects on the existing properties on the south side of Park Lane are concerned, the proposed THFC Foundation/hotel/residential development will have a beneficial impact as a result of the greater distance separation and physical screening from the proposed new stadium that this part of the Project will introduce. The reduction in match day noise levels at existing Park Lane houses due to relocation of the stadium will be of the order of 9 dB(A) when comparing the existing stadium with the extant and proposed stadia based on the measured data and the analysis set out in Appendix 13.9. Assuming up to a further 5 dB(A) attenuation due to the screening afforded by the intervening proposed commercial/residential development the combined effect will be to more than halve the loudness of noise heard there following a goal for example.

13.5.36 The potential impact of football matches and other events held within the stadium has been assessed mainly on the basis of the noise level measurements made during the Tottenham Hotspur -v- Liverpool Carling Cup match played on the evening of Wednesday 12 November 2008. Detailed results and commentary for the measurements made at locations S6 and S7 inside the stadium are presented in Appendix 13.6 and those for external measurement locations R8 to R21 in Appendices 13.7 and 13.8.

13.5.37 Based on the immediate post goal noise levels reported in paragraph 13.3.10 it is anticipated that the noise levels experienced at 30 Park Lane and 41 Worcester Avenue effectively will be reversed with properties in Park Lane and side roads off it seeing a beneficial change of at least approximately 8.5 dB(A) and those in Worcester Avenue seeing a negative change of about the same value. These changes would rate as major positive and negative impacts respectively, but will be confined to specific ‘events’ occurring during matches rather than necessarily to the general ambient noise at those times.

13.5.38 There are also a number of residential properties on the east side of High Road that may experience smaller increases in noise as a result of the proposed stadium being closer to them. 30 Park Lane effectively serves as a proxy assessment location for a significantly greater number of properties than does 41 Worcester Avenue because of the alignment and relative position of these roads with respect to both the existing and the proposed stadia. To that extent, although any change may be unwelcome to residents in Worcester Avenue, the corresponding benefit to residents in Park Lane, Bromley Road and Lancaster Close for example will be more widely felt. The properties on Park Lane within 25m of the south stand of the current stadium include the east half of Concorde House (comprising 22 flats in the entire block), number 1 Lancaster Place, and the even numbers from 28 to 56 Park Lane of which 14 are residential or have residential accommodation above a ground floor commercial premises. On Worcester Avenue, within a similar distance of the proposed stadium, there are only three houses. Within 100m of the existing south stand there is approximately 100 residences compared with approximately 40 within a similar distance of the north east corner of the proposed stadium. It is anticipated that the structure of the new stadium will afford greater sound insulation resulting in less noise break-out to residential areas although this has not been assumed in the predictions made in paragraph 13.5.37 above.

13.5.39 Currently the main noise sources associated with the stadium on non-match days include:

- Fixed plant noise, mainly fans serving kitchen extracts air cooling units and the under pitch heating
Visits by service vehicles making deliveries or collecting refuse, etc.

13.5.40 On match days, because of the existence of the Controlled Parking Zone, vehicular traffic in the immediate vicinity of the stadium assumes less significance than the following:

- Home supporters making their way to the stadium on foot from local stations and bus stops;
- Away supporters congregating in the vicinity of the entrances to their areas of the South Stand;
- Fixed plant noise, mainly fans serving kitchen extracts air cooling units;
- Temporary vendor stalls in the front garden of properties on the south side of Park Lane and other locations beside the stadium in Worcester Avenue and Paxton Road;
- TV outside broadcast vehicles and Police horse boxes with generator sets parked in the car/lorry park and in Worcester Avenue north of the stadium;
- Crowd noise from within the stadium, particularly following a goal when PA noise also is evident; and
- Rhythmic drumming on the profiled steel cladding of upper stand sections of the north and south stands following a goal.

13.5.41 As can be seen in paragraph 13.5.31 the worst-case increase in noise levels during football matches will be in the order of 0.4dB when comparing the proposed development with the extant permission and 2.3 dB when comparing the existing and proposed stadia. When making this similar assumption in terms of noise from supporters, a direct, permanent effect of negligible significance would result at existing receptors during football matches when comparing the extant permission and the proposed development. A direct, permanent minor negative (insignificant) effect is likely when comparing the existing and proposed development.

Music Concert and NFL Noise

13.5.42 The project includes use of the stadium for up to 16 non-football related events each calendar year. There will all be up to six concerts per year and up to ten major sports events per year with a minimum of two NFL games.

13.5.43 As discussed above it is recommended that for the use of the stadium for 16 non-football related events each year the absolute noise level limit of $L_{Aeq,15m} = 75$ dB should be adopted.

Music Concert Noise

13.5.44 In order to assess the impact of concerts held within the stadium a computer generated model has been constructed by Vanguardia to predict off site noise levels. The predicted levels have been provided to WSP in spreadsheet format and are summarised below for the existing receptors close to the site.

<table>
<thead>
<tr>
<th>Location</th>
<th>Predicted Music Noise Levels ($L_{Aeq,15m}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park Lane</td>
<td>68 dB</td>
</tr>
<tr>
<td>Northumberland Park</td>
<td>60 dB</td>
</tr>
<tr>
<td>Worcester Avenue</td>
<td>67 dB</td>
</tr>
<tr>
<td>High Road</td>
<td>73 dB</td>
</tr>
</tbody>
</table>

13.5.45 The results of the modelling of concert noise have been plotted as a map with noise level contours at 1.8m above the height of the south podium (i.e. approximately 7.4m above ground level on Park Lane)
and this is reproduced in Appendix 13.10. It can be seen that generally the noise is well contained.

13.5.46 The predicted noise levels at existing receptors meet the criterion of 75 dB $L_{Aeq}$ and so no mitigation measures are considered necessary.

13.5.47 It is considered that a direct, temporary, effect of negligible to minor negative significance would result at existing receptors during concerts.

13.5.48 Major Sporting Event Noise Levels

13.5.49 There will be up to ten major sporting events with a minimum of two NFL games. Noise levels during the NFL games have been predicted by Vanguardia, as set out below.

### Table 13.18: Predicted Off-site NFL Levels at Existing Dwellings

<table>
<thead>
<tr>
<th>Location</th>
<th>Predicted NFL Noise Levels ($L_{Aeq,even}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park Lane</td>
<td>51 dB</td>
</tr>
<tr>
<td>Northumberland Park</td>
<td>46 dB</td>
</tr>
<tr>
<td>Worcester Avenue</td>
<td>54 dB</td>
</tr>
<tr>
<td>High Road</td>
<td>64 dB</td>
</tr>
</tbody>
</table>

13.5.50 With the exception of Worcester Avenue, the predicted noise levels during NFL games are at least 10 dB below the lowest daytime $L_{Aeq,16hour}$ noise levels shown in Table 13.8. At Worcester Avenue the predicted NFL noise levels are between 2 and 10 dB lower than the existing daytime $L_{Aeq,16hour}$ noise levels. It is therefore possible that NFL games will be audible at the existing dwellings on Worcester Avenue. However, Vanguardia has predicted that the NFL noise levels at each receptor will be at least 10 dB lower than noise levels during concerts.

13.5.51 The NFL matches meet the target criterion of 75 dB $L_{Aeq,even}$ and so no mitigation is considered necessary.

13.5.52 It is considered that a direct, temporary, effect of negligible to minor negative significance would result at existing receptors during NFL games.

13.5.53 External Fixed Plant Noise

13.5.54 The exact locations of external plant and indeed the type and number have not been finalised at this stage. It is, therefore, appropriate to set a performance standard for cumulative plant noise from the proposed development. Please note that the performance standard below relates to all noise sources controlled by BS 4142 as set out in paragraph 13.2.92 above.

### Table 13.19: Cumulative Fixed Plant Noise Control Limit at Receptor

<table>
<thead>
<tr>
<th>Noise Sensitive Receptor</th>
<th>$L_{A,th}$ (dB) 07:00 - 23:00 Hours</th>
<th>$L_{A,lm}$ (dB) 23:00 - 07:00 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park Lane</td>
<td>53&lt;sup&gt;1&lt;/sup&gt;</td>
<td>45&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Northumberland Park</td>
<td>42&lt;sup&gt;1&lt;/sup&gt;</td>
<td>45&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Worcester Avenue</td>
<td>51&lt;sup&gt;1&lt;/sup&gt;</td>
<td>45&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>High Road</td>
<td>54&lt;sup&gt;1&lt;/sup&gt;</td>
<td>45&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Notes  
1 From minimum $L_{A90,T}$ in Table 13.8.  
2 From WHO Guidelines maximum $L_{Aeq,8h}$ outside a bedroom with window open (Appendix 13.2)
13.5.55 Note that the above limits are set as rating levels – see Appendix 13.2.

13.6 Additional Mitigation, Compensation and Enhancement Measures

*Construction Noise*

13.6.1 The assessment has found that the noise impacts during the construction works may be significant when taking place in close proximity to existing noise sensitive properties. It will therefore be necessary to consider the available measures to reduce the levels of noise that will arise during the works.

13.6.2 The mitigation measures for construction noise recommended in this chapter will be incorporated within a comprehensive Construction Environmental Management Plan (CEMP) for the project.

13.6.3 Several legislative safeguards exist to minimise the effects of construction noise and would be applicable during the construction of the proposed development. These safeguards include:

- The various EC Directives and UK Statutory Instruments that limit the noise emissions of a variety of construction plant; and
- The powers that exist for local authorities under Sections 60 of the Control of Pollution Act 1974 and Section 80 of the Environmental Protection Act 1990 to control noise (and vibration) on construction sites and statutory nuisance respectively.

13.6.4 The Considerate Constructors Scheme, details of which can be found at the web page www.considerateconstructorsscheme.org.uk, is a scheme under which registered sites are monitored by an experienced industry professional to assess their performance against the eight point Code of Considerate Practice which includes the categories: ‘Considerate’, ‘Environment’, ‘Cleanliness’, ‘Good Neighbour’, ‘Respectful’, ‘Safe’, ‘Responsible’ and ‘Accountable.’ The main contractor will be required to register the site under this scheme.

13.6.5 Contract documents supplied to contractors will require that the effects of environmental noise are considered during the design and execution of the works. Such an assessment will require a noise control plan that provides a noise management system tailored to the specific needs of the construction works, the site and the surrounding area. As a minimum, any noise control plan will cover:

- Procedures for ensuring compliance with statutory or other identified noise control limits;
- Establishment of noise Action Levels (to be agreed with Haringey Council) above which consideration will be given to the use of alternative techniques and/or other means of reducing noise with the aim on ensuring that the Action Level (or below) is achieved. All practicable measures would be considered and implemented where appropriate together with additional consultation with the occupiers of potentially affected receptors;
- Review of demolition and construction techniques, especially in response to exceedences of the Action Level and/or complaints;
- Procedures for ensuring that all works are carried out according to the principle of “Best Practicable Means” as defined in the Control of Pollution Act 1974;
- General induction training for site operatives and specific training for staff having responsibility for particular aspects of controlling noise from the site;
- A monitoring / auditing programme; and
- Liaison with Haringey Council and the local business community.
13.6.6 The adoption of Best Practicable Means is usually the most effective way of controlling noise from construction sites and should be enforced rigorously. In order to demonstrate the adoption of Best Practicable Means to control noise emission from the site, the following conditions and measures would be imposed on the construction works:

- Local hoarding, screens or barriers will be erected as necessary to shield particularly noisy activities;
- Contractors will be required to bring to the site and employ on the works only the most environmentally acceptable and quietly operating plant and equipment compatible with the safe and efficient execution of the works;
- Noise emitted by any plant item will be required not to exceed the limits quoted in either the relevant EC Directive or UK Statutory Instrument and will be required to be no greater than the relevant values quoted in the current version of BS 5228;
- All plant items will be properly maintained and operated according to manufacturers’ recommendations in such a manner as to avoid causing excessive noise;
- All plant will be sited so that the noise impact at nearby noise sensitive properties is minimised;
- All items of plant operating on the site in intermittent use will be shut down in the periods between use;
- Any compressors brought on to site will be silenced or sound reduced models fitted with acoustic enclosures;
- All pneumatic tools will be fitted with silencers or mufflers;
- The excavation of any existing structures will, wherever possible, be undertaken without the use of pneumatic breakers;
- Wherever possible, the use of hydraulic attachments or other means of crushing concrete and hard materials will be used in preference to pneumatic breakers. Where the use of impact breakers is necessary, their attachment to larger and heavier excavators often can reduce the level of vibration;
- Care will be taken when erecting or striking scaffolds to avoid impact noise from banging steel. All operatives undertaking such activities should be instructed on the importance of handling the scaffolds to reduce noise to a minimum;
- Care will be taken when unloading vehicles to minimise noise. Delivery vehicles should be routed so as to minimise disturbance to local residents and all vehicles to enter/exit the site during the working hours to be agreed with Haringey Council. Construction traffic routeing will be agreed with Haringey Council. Delivery vehicles should be prohibited from waiting on the highway or within the site with their engines running; and
- No radios or music will be permitted to be played on the site.

13.6.7 Problems concerning noise from construction works can sometimes be avoided by taking a considerate and neighbourly approach to relations with the local residents and businesses.

13.6.8 A large amount of the material excavated during the construction process will be reused on the site, including gravel and sand. There is the opportunity to use a close-by off-site location to process this material rather than sending it to a more remote location.

13.6.9 The off-site construction compound, known as Goods Yard, is on White Hart Lane to the north-west of the site. It is located to the east of White Hart Lane railway station and to the west of Peacock Industrial Estate.
13.6.10 Should planning permission be granted for the construction compound, it will act as a mitigation measure in that vehicles will not be required to transport excavated material to a remote location and then make the return journey to the site will be processed material. Instead, it will be the shorter trip to the Construction Compound.

13.6.11 Without the Construction Compound, the vehicles would use High Road and A406 North Circular.

13.6.12 The noise assessment submitted with the planning application for the Construction Compound assessed potential noise impacts from the operations within the site as well as those associated with off-site vehicle movements. The assessment concluded that during core working hours (08:00 to 18:00 Monday to Friday and 08:00 to 13:00 hours on Saturdays) there would be a negligible impact at all receptors assessed. During extended working hours (13:00 to 18:00 Saturdays and 08:00 to 18:00 Sundays) there is likely to be a negligible impact with the exception of Rivers Apartments Tower (to the north of the Construction Compound) during on-site operations and properties on White Hart Lane with respect to construction vehicles where a minor adverse (insignificant) impact has been predicted.

13.6.13 The assessment concluded that no significant noise-related impacts are expected to arise as a result of the operation of the Construction Compound. Please see Appendix 13.11 for the Construction Compound noise assessment.

Construction Vibration

13.6.14 As for noise, Best Practicable Means should be adopted – the mitigation measures set out in paragraphs 13.6.4 to 13.6.7 include those relevant to construction vibration. In particular, the means of demolishing the existing buildings and removal of areas of hardstanding that are close to existing dwellings should be given due consideration. Due to the lack of a detailed construction programme at this stage of the development process, it is not possible to determine the most suitable mitigation measures for vibration. However, it is likely that some vibration will be experienced at sensitive properties close to the site. In situations where the detailed construction programme enables these impacts to be determined more precisely, other measures may need to be in place, such as leaflet drops informing occupiers of the duration of the works and explaining that building damage is highly unlikely to occur. Vibration control measures will be incorporated within the CEMP for the project.

13.6.15 As building damage is highly unlikely, it is human disturbance resulting from vibration for which mitigation may be required. Liaising with the local community will be important as this type of vibration is generally less of an issue if residents can anticipate it. It may be that for vibration generating works, a “two hours on/two hours off” approach can be employed to allow residents respite. This may reduce the impact to direct, short-term minor negative (insignificant).

Operation

Operational Road Traffic Noise

13.6.16 The assessment of operational road traffic noise is a worst-case assessment and does not consider the restrictions on car movements to the proposed residential and hotel developments on match days. Furthermore, it does not consider the on-street parking restrictions enforced on match days. These will result in a decrease in the impacts stated in above with respect to Park Lane and Worcester Avenue. As such, no specific mitigation measures are considered necessary.
Stadium Noise

13.6.17 The noise levels during football matches, music concerts and NFL games are predicted by Vanguardia to meet the 75 dB $L_{A_{eq},T}$ criterion at the existing receptors. As such, no mitigation measures are considered necessary. However, this is not to say that such events will not be audible. As such, it is anticipated that there will be a direct, long-term (although short in duration when they occur) negligible to minor negative (insignificant) impact.

13.6.18 However, the public address system and other such noise sources will be addressed at the detailed design stage with mitigation measures recommended, where necessary.

13.6.19 Notwithstanding the above, it is recommended that residents are notified prior to any non-football events such that they can anticipate an increase in noise level for a short period.

13.7 Assessment Summary and Residual Environmental Impacts and Effects

Construction

Construction Noise

13.7.1 Following implementation of the recommended mitigation measures, it is anticipated that at the closest existing noise sensitive properties the magnitude of impact could still be such that there may be a direct, temporary residual effect of moderate or even major negative significance on occasion. Accordingly, every effort should be made to keep noise levels to a minimum, with an emphasis on adopting Best Practicable Means and maintaining good communication between the various parties, i.e. the developers/contractors, Haringey Council and the occupants of the affected buildings.

13.7.2 At the majority of the existing receptors in the area, as opposed to the minority discussed above, the residual effect is likely to be negligible to minor negative and there will be no permanent effects.

Construction Vibration

13.7.3 Like noise, vibration impacts (on neighbouring occupants) during demolition works are inevitable, particularly when dwellings are in close proximity. Following implementation of mitigation measures that it is assumed would maintain levels of vibration below 1.06 mm/s, it is anticipated that the magnitude of impact will be such that at worst there may be a direct, temporary residual effect of moderate negative significance.

13.7.4 The impact on the fabric and structure of neighbouring buildings will be negligible, which means that there will be no permanent effects buildings.

Operation

Operational Road Traffic Noise

13.7.5 Due to negative growth in terms of baseline traffic and the context in which the operational road traffic noise assessment has been presented, it is anticipated that there will be mostly direct, permanent negligible impacts on the surrounding road network as a result of the proposed development.

13.7.6 At Park Lane and Worcester Avenue there is likely to be a direct, permanent minor negative (insignificant) effect.
Stadium Noise

13.7.7 There will be a direct, permanent, negligible to minor effect at existing receptors as a result of stadium noise.

External Fixed Plant Noise

13.7.8 Assuming that all plant can be designed to achieve the noise limits stated in Table 13. 19 there will be a direct, permanent, negligible effect.

Site Suitability Assessment

13.7.9 This section presents an assessment of the suitability of the site for residential development.

13.7.10 The baseline noise measurement results and the predicted future noise levels have been assessed against the target internal noise levels in BS 8233:2014 and the WHO Guidelines for Community Noise. The target noise levels are 35 dB $L_{A_{eq},16\text{hour}}$ for daytime habitable rooms and 30 dB $L_{A_{eq},8\text{hour}}$ and 45 dB $L_{A_{F_{max}}}$ for bedrooms.

13.7.11 The primary noise source affecting the proposed residential element in the south of the site is road traffic on Park Lane and Worcester Avenue. Additionally, whilst the stadium is in use, noise from football matches, concerts and NFL games will contribute to the noise climate.

13.7.12 During the baseline noise survey the road traffic noise levels from Park Lane and Worcester Avenue were measured at locations P1 and P4 respectively.

13.7.13 The highest log average weekday daytime $L_{A_{eq},16\text{hour}}$ at measurement location P1 was 66 dB and the night-time $L_{A_{eq},8\text{hour}}$ was 61 dB. At P4 the highest log average weekday daytime $L_{A_{eq},16\text{hour}}$ was 58 dB and the highest night-time $L_{A_{eq},8\text{hour}}$ was also 58 dB.

13.7.14 These data were gathered in 2008 and it is recognised that noise levels in the area may have changed a little since then. The results of the operational road traffic noise assessment have been drawn on to determine any changes in road traffic noise levels on Park Lane and Worcester Avenue since 2008. The operational road traffic noise assessment has concluded that any changes in noise levels are insignificant. On this basis the measured noise levels are considered appropriate for use in this assessment.

13.7.15 The approximate road traffic noise levels at the proposed residential towers are summarised in Table 13. 20 below.

<table>
<thead>
<tr>
<th>Proposed Residential Building</th>
<th>Facade</th>
<th>***Daytime $L_{A_{eq},16\text{hour}}$</th>
<th>***Night-time $L_{A_{eq},8\text{hour}}$</th>
<th>Typical *Night-time $L_{A_{F_{max}}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower A</td>
<td>Eastern</td>
<td>58</td>
<td>56</td>
<td>73</td>
</tr>
<tr>
<td>Tower B</td>
<td>Eastern</td>
<td>58</td>
<td>56</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>Southern</td>
<td>66</td>
<td>61</td>
<td>73</td>
</tr>
<tr>
<td>Tower C**</td>
<td>Eastern</td>
<td>49</td>
<td>47</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>Southern</td>
<td>57</td>
<td>52</td>
<td>54</td>
</tr>
<tr>
<td>Tower D</td>
<td>Southern</td>
<td>66</td>
<td>61</td>
<td>73</td>
</tr>
</tbody>
</table>
13.7.16 Vanguardia has predicted noise levels at the proposed residential towers in the south of the site with respect to noise from the proposed stadium events. The highest of these noise levels are summarised in Table 13.21 and in each instance is the noise level predicted at the northern façade of the proposed tower.

Table 13.21: Highest Predicted Stadium Noise Levels at Proposed Residential Towers, dB

<table>
<thead>
<tr>
<th>Proposed Residential Building (northern façade)</th>
<th>Concert Noise Level $L_{A_{eq,15min}}$</th>
<th>Football Noise Level $L_{A_{eq,Event}}$</th>
<th>NFL Noise Level $L_{A_{eq,Event}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower A</td>
<td>78</td>
<td>69</td>
<td>70</td>
</tr>
<tr>
<td>Tower B</td>
<td>73</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Tower C</td>
<td>81</td>
<td>68</td>
<td>69</td>
</tr>
<tr>
<td>Tower D</td>
<td>74</td>
<td>67</td>
<td>68</td>
</tr>
</tbody>
</table>

13.7.17 The noise levels in Table 13.20 and Table 13.21 set out the noise levels at the proposed facades with respect to road traffic and stadium noise respectively. These levels have been used to determine the generic sound insulation performance requirements for the glazing and the ventilation strategy.

13.7.18 The mitigation for the daytime (07:00 to 23:00 hours) habitable rooms of the residential towers have been derived considering the noise levels during concerts as well as the road traffic noise levels. In each instance, the higher of these values has been used to specify the glazing for daytime habitable rooms. The night-time (23:00 to 07:00 hours) noise levels will consider the road traffic noise from Park Lane and Worcester Avenue. Given that the residential aspect is being submitted in outline only, this simplified approach is considered acceptable.

13.7.19 The sound reduction performance requirements for the building façade can be calculated by subtracting the target criteria from the derived noise levels. Since glazing is typically the weak link in the acoustic performance of the building façade, at this stage, these values can be taken as a requirement for the glazing units.

13.7.20 BS 8233 identifies two methods to determine the degree of noise attenuation required from a building façade based on a known external noise level, one of which is a ‘simple calculation’ and the other a ‘more rigorous calculation’ which considers the frequency spectrum of the noise source and the acoustic absorption in the room. With respect to the simple calculation, BS 8233 (Section G.1) includes the following advice:

“Strictly, the insulation values used here relate to a pink noise spectrum, and actual values achieved are lower for traffic noise. Furthermore, the method does not take account of the absorption (e.g. furnishings) in the room. However, the $R_w$ values suffice for a rough calculation, although it is likely to underestimate the level in the room by up to 5 dBA. Where the estimate is within 5 dBA of the target noise level, a more rigorous calculation needs to be carried out using octave bands…”

13.7.21 The following table sets out the sound insulation performance requirements for the glazing units for habitable rooms in the residential towers. Both the $L_{A_{eq}}$ and $L_{A_{max}}$ noise levels are considered, as required...
in BS 8233 and the WHO guidelines. Given the outline application for the residential aspect of the scheme, the calculations have adopted the BS 8233 simple method and the +5 dB adjustment to allow for the frequency content of the noise source and the acoustics of habitable rooms has cautiously been included.

### Table 13.22: Sound Reduction Requirements for Proposed Residential Facades, dB

<table>
<thead>
<tr>
<th>Location</th>
<th>Period</th>
<th>External Noise Level*</th>
<th>Target Criteria</th>
<th>Sound Reduction (R&lt;sub&gt;W&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower A</td>
<td>Daytime L&lt;sub&gt;Aeq&lt;/sub&gt;</td>
<td>83</td>
<td>35</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Night-time L&lt;sub&gt;Aeq&lt;/sub&gt;</td>
<td>61</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Night-time L&lt;sub&gt;A1max&lt;/sub&gt;</td>
<td>78</td>
<td>45</td>
<td>33</td>
</tr>
<tr>
<td>Tower B</td>
<td>Daytime L&lt;sub&gt;Aeq&lt;/sub&gt;</td>
<td>78</td>
<td>35</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Night-time L&lt;sub&gt;Aeq&lt;/sub&gt;</td>
<td>66</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Night-time L&lt;sub&gt;A1max&lt;/sub&gt;</td>
<td>78</td>
<td>45</td>
<td>33</td>
</tr>
<tr>
<td>Tower C</td>
<td>Daytime L&lt;sub&gt;Aeq&lt;/sub&gt;</td>
<td>86</td>
<td>35</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Night-time L&lt;sub&gt;Aeq&lt;/sub&gt;</td>
<td>57</td>
<td>30</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Night-time L&lt;sub&gt;A1max&lt;/sub&gt;</td>
<td>59</td>
<td>45</td>
<td>14</td>
</tr>
<tr>
<td>Tower D</td>
<td>Daytime L&lt;sub&gt;Aeq&lt;/sub&gt;</td>
<td>79</td>
<td>35</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Night-time L&lt;sub&gt;Aeq&lt;/sub&gt;</td>
<td>66</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Night-time L&lt;sub&gt;A1max&lt;/sub&gt;</td>
<td>78</td>
<td>45</td>
<td>33</td>
</tr>
</tbody>
</table>

*Includes +5dB correction in accordance with the BS 8233 simple calculation.

13.7.22 The above calculations have been undertaken using the methodology described to demonstrate that a workable solution exists which would result in the WHO internal target values being achieved. Detailed glazing calculations (based on the frequency spectrum of the source, building façade dimensions and internal room acoustics) will be required at the later design stage to determine the precise glazing requirements.

13.7.23 As an example, a Protec Classic 9-16-10 argon plus 9mm secondary pane would achieve an R<sub>W</sub> of 50 dB. Whilst this specification falls 1 dB short of the requirements in Table 13.22 it is considered appropriate to specify, given that concerts may occur up to six times per year. It is recommended that this assessment is revisited at the detailed design stage and that possibly another baseline noise survey be undertaken to validate the 2008 data.

13.7.24 The above assessment assumes that windows remain closed. Consequently, it is necessary to consider how adequate ventilation is to be provided to the most noise exposed building façades. On ventilation, BS 8233 advises that:

13.7.25 “The Building Regulations’ supporting documents on ventilation recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant’s choice”.

13.7.26 It is recommended that the residential units are provided with mechanical ventilation and that windows remain openable for rapid or purge ventilation.

13.7.27 With the above mitigation measures, there should be a direct, long-term negligible impact.
Cumulative Assessment

13.7.28 The following schemes have been included in the cumulative assessment of operational road traffic noise (i.e. the potential impact of development related road traffic noise on the surrounding road network).

- Image House, Station Road, N17 9LR. A 96 bed hotel (low car use).
- 5 Bruce Grove, N17 6RA. Four apartments and ten houses (low car use)
- Vacant land between 17 and 34 Pretoria Road, N17 8DX. Extra care facility of 52 units (low car use).

13.7.29 Table 13. 23 below sets out the changes in noise levels between the 2015 baseline and the 2021 baseline including the proposed development and the above cumulative schemes.

13.7.30 As with the operational road traffic noise assessment presented above, the road links were the flows are below the required threshold in CRTN have been excluded from the assessment.

Table 13. 23: Predicted Changes in Road Traffic Noise BNL between AADT 2015 Baseline and Baseline including 2021 Proposed Development Plus Cumulative Developments

<table>
<thead>
<tr>
<th>Link/Description</th>
<th>Change in BNL dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. White Hart Lane, just west of A1010 High Road</td>
<td>+0.1</td>
</tr>
<tr>
<td>2. White Hart Lane, just west of Fenton Road</td>
<td>0</td>
</tr>
<tr>
<td>3. A1010 High Road, just south of White Hart Lane</td>
<td>+0.2</td>
</tr>
<tr>
<td>4. A10 High Road, just south of Bruce Grove</td>
<td>+0.1</td>
</tr>
<tr>
<td>4A. A10 High Road, just south of Monument Way</td>
<td>+0.1</td>
</tr>
<tr>
<td>6. A1010 High Road, just south of Park Lane</td>
<td>+0.2</td>
</tr>
<tr>
<td>7. Northumberland Park, between Worcester Avenue and Bennetts Close - east of Sainsbury</td>
<td>+0.1</td>
</tr>
<tr>
<td>10. A1010 High Road, just south of Brantwood Road</td>
<td>+0.1</td>
</tr>
<tr>
<td>11. A1010 Fore Street, just south of A406</td>
<td>+0.1</td>
</tr>
<tr>
<td>12. Lordship Lane, just west of A1010 High Road</td>
<td>+0.1</td>
</tr>
<tr>
<td>15. White Hart Lane, just east of the A10 Great Cambridge Road</td>
<td>+0.1</td>
</tr>
<tr>
<td>16. Leeside Road, just east of Willoughby Lane</td>
<td>0</td>
</tr>
</tbody>
</table>

13.7.31 Comparing the result of the cumulative operational road traffic noise assessment with the assessment criteria in Table 13. 6 it can be seen that on all road links assessed, there will be a direct, permanent negligible impact.

13.7.32 As with the operational road traffic noise assessment for the proposed development only, the following road links have flows below the CRTN threshold and have, therefore, not been assessed in Table 13. 23:

- Park Lane, just east of A1010 High Street;
- Worcester Avenue, just north of Park Lane; and
- Worcester Avenue, just south of Northumberland Park.

13.7.33 The cumulative schemes do not add to the road traffic flows on the above road links. As such, there is no impact on these roads as a result of the above cumulative schemes.
### Environmenta l Effect

#### Construction Effects

<table>
<thead>
<tr>
<th>Environmenta l Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significanc e</th>
<th>Additional Mitigation</th>
<th>Residual impact Magnitud e</th>
<th>Residual Significanc e of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction noise</td>
<td>High</td>
<td>Negative</td>
<td>Negligible to major</td>
<td>Negligible to major</td>
<td>Implementation of a CEMP Application of the principle of Best Practicable Means</td>
<td>Negligible to major</td>
<td>Negligible to major</td>
</tr>
<tr>
<td>Construction vibration</td>
<td>High</td>
<td>Negative</td>
<td>Negligible to moderate</td>
<td>Negligible to moderate</td>
<td>Implementation of a CEMP Application of the principle of Best Practicable Means</td>
<td>Negligible to moderate</td>
<td>Negligible to moderate</td>
</tr>
</tbody>
</table>

#### Operational Effects

<table>
<thead>
<tr>
<th>Operational Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significanc e</th>
<th>Additional Mitigation</th>
<th>Residual impact Magnitud e</th>
<th>Residual Significanc e of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational road traffic noise</td>
<td>High</td>
<td>Negative</td>
<td>Negligible to moderate</td>
<td>Negligible to moderate</td>
<td>None</td>
<td>Negligible to minor</td>
<td>Negligible to minor</td>
</tr>
<tr>
<td>Match day noise</td>
<td>High</td>
<td>Neutral</td>
<td>Negligible to major</td>
<td>Negligible to major</td>
<td>None</td>
<td>Negligible to minor</td>
<td>Negligible to minor</td>
</tr>
<tr>
<td>Music concert noise</td>
<td>High</td>
<td>Negative</td>
<td>Negligible to minor</td>
<td>Negligible to minor</td>
<td>None</td>
<td>Negligible to minor</td>
<td>Negligible to minor</td>
</tr>
<tr>
<td>NFL noise</td>
<td>High</td>
<td>Negative</td>
<td>Negligible to minor</td>
<td>Negligible to minor</td>
<td>None</td>
<td>Negligible to minor</td>
<td>Negligible to minor</td>
</tr>
<tr>
<td>External fixed plant noise</td>
<td>High</td>
<td>Negative</td>
<td>Not assessed but potentially major</td>
<td>Not assessed but potentially major</td>
<td>Mitigation to be considered at the detailed design stage to ensure all relevant noise sources meet the noise limits in Table 13. 19.</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
14. Socio-Economics

14.1 Introduction

14.1.1 This chapter of the ES has been produced by Quod. It addresses the potential socio-economic effects of the Project against an identified baseline of the local and wider area around the Project Site. The assessment includes a summary of the current relevant economic, employment, housing and community infrastructure conditions in the local area, Tottenham and administrative areas of Haringey, Enfield and London where relevant (see Section 14.2), a quantitative and qualitative assessment of the effects of the Project on these receptors, and identification of mitigation measures where appropriate for any significant effects that may arise.

14.2 Assessment Criteria and Methodology

Previous Assessment

14.2.1 A socio-economic assessment was submitted as part of the previous planning application on the Project Site in May 2010 (application reference HGY/2010/1000).

14.2.2 This was followed by two separate applications which required addendums to the original May 2010 ES. The addendums dealt with Phase 1 the Northern Development (application reference HGY/2011/2350, and Addendum No.1) and Phase 3 the Southern Development (application reference HGY/2011/2351 and Addendum No. 2). The Northern Development has since been completed and is operational.

14.2.3 There has also been a Section 73 application (HGY/2015/0964) which comprised a new basement under the proposed north, east and west stands of the approved stadium, which measures 19,618 sqm GIA. These changes have reconfigured parking between levels, and provided additional changing rooms and media facilities to allow the stadium to host tournament football.

14.2.4 Demolition and site preparation works have commenced on the northern part of the Project Site, to the south of Lilywhite House.

Scoping Opinion

14.2.5 Although a formal Scoping Opinion was not sought the Scope of the EIA was based on the technical scope for the original 2010 ES and the Southern Addendum. A draft Scoping Report was sent to the Council on the 19th June 2015, for their informal comments and discussion. No informal comments were received in relation to the Socio-Economic draft Scope.

Planning Policy and Guidance

14.2.6 This section refers to relevant policy and guidance at a National (UK), Sub-national (London), and Local (Haringey Borough and Tottenham (i.e. east Haringey)) level. The assessment has regard to relevant spatial planning policies related to housing, employment and economic growth and the adequate provision of community facilities.
National Planning Policy

14.2.7 The National Planning Policy Framework (NPPF) was published by DCLG in 2012, consolidating previous planning policy statements, promoting sustainable development, and prioritising strong, vibrant and healthy communities and contributing to building a strong, responsive and competitive economy.

14.2.8 As part of a commitment to securing local economic growth, the NPPF aims to plan proactively to meet the development needs of business and support an economy fit for the 21st Century, promote the vitality and viability of town centres, create sustainable, inclusive and mixed communities, including through the regeneration and renewal of areas of poor housing, and create a built environment that facilitates social integration and inclusive communities.

14.2.9 At the heart of the NPPF is a presumption in favour of sustainable development. The purpose of the planning system is to contribute to the achievement of sustainable development which includes social, economic and environmental roles (Paragraph 6-7). Paragraph 14 states that “Local Authorities should positively seek opportunities to meet the development needs of their area.”

14.2.10 Paragraph 17 of the NPPF sets out several core land-use planning principles that should underpin decision-taking. These include the need for planning decisions to:

- Proactively drive and support sustainable economic development to deliver the homes, businesses and industrial units, infrastructure and thriving local places that the country needs;
- Always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings; and
- Promote mixed use developments and encourage multiple benefits from the use of land in urban and rural areas.

14.2.11 The planning system has three key, interdependent roles (set out at Paragraph 7):

- An economic role: ensuring that the right amount of land is available at the right time and place in order to support growth and innovation;
- A social role: providing the supply of housing and local services required to meet the needs of present and future generations and to support health, social and cultural well-being; and
- An environmental role: contributing to protecting and enhancing our natural, built and historic environment.

14.2.12 The NPPF outlines a number of objectives to deliver sustainable development. These include:

- Objective 1: Building a strong, competitive economy (Paragraphs 18-22): significant weight should be placed on the need to support economic growth in the planning system. Planning policies should recognise and seek to address potential barriers to investment, including a poor environment or a lack of infrastructure, services or housing.
Objective 6: Delivering a wide choice of high quality homes (Paragraphs 47-55): Housing applications should be considered in the context of the presumption in favour of sustainable development. Local authorities should aim to deliver a wide choice of high quality homes and widen opportunities for home ownership and create sustainable, inclusive and mixed communities. Where there is an identified need for affordable housing, this should be brought forward on-site unless off-site provision or a financial contribution of broadly equivalent value can be robustly justified.

Objective 8: Promoting healthy communities (Paragraphs 69-78): Planning policies and decisions should promote social interaction, including through mixed use developments, neighbourhood centres and active street frontages. They should promote safe and accessible environments where crime or fear of crime do not undermine quality of life, and which encourage active and continual use of public areas. Consideration should be given to the provision of shared space, community facilities and local services to enhance the sustainability of communities.

Sub-National Planning Policy

14.2.13 The London Plan (2015) sets out the Mayor’s vision for London, and proposals for how to achieve this. The London Plan sets out the strategic plan for the integrated economic, environmental, transport and social development of London over the next 20 to 25 years. The changes made to the now adopted London Plan in the form of further alterations sought to reflect the need to plan for the housing and economic capacity needed for London’s sustainable development against the background of the growth trends revealed by the 2011 Census.

14.2.14 The London Plan sets out a ‘new focus on quality of life,’ stating that issues such as accessible homes; deprivation and exclusion; health inequalities; the natural environment; vibrant town centres; and safety and community should be valued alongside economic growth.

14.2.15 The Plan seeks to promote mixed use development maximising the potential of previously developed sites. It supports the provision of high quality open space and play space, and appropriate community provision and the encouragement of the tourism and leisure sectors. It also promotes the creation of local employment in developments and the promotion of skills training and other initiatives to enable this.

14.2.16 Northumberland Park and the wider Upper Lee Valley are key strategic target areas for regeneration as identified in the adopted London Plan and other key strategic London-wide policy documents. The London Plan now projects significant population growth in Haringey, with a 29.5% increase over the period 2011-2036 making it the largest proportional increase of any London borough. As a result, new housing requirements have been estimated at 15,019 over the period 2015 to 2025.

14.2.17 The London Plan identifies the Upper Lee Valley (which covers the Tottenham area) as one of 38 Opportunity Areas (Policy 2.13). Opportunity Areas are described as representing ‘the capital’s major reservoir of brownfield land with significant capacity to accommodate new housing, commercial and other development linked to existing or potential improvements to existing or potential improvements to public transport accessibility’ (para. 2.58). Annex 1 of the London Plan sets out the quantum of development anticipated to be accommodated by London’s Opportunity Areas. The Upper Lee Valley is set an indicative employment capacity of 15,000 jobs and a minimum new homes target of 20,100. There is recognition that development in the Opportunity Area should provide stimulus for regeneration in existing
communities including those in Edmonton, the Tottenham corridor to Stoke Newington and around Blackhorse Lane.

14.2.18 In addition, the London Plan identifies large parts of Haringey, including Northumberland Park Ward as an “Area for Regeneration” (Policy 2.14). These areas are intended to be the focus of spatial policies that bring together regeneration, development and transport objectives with improvements in learning and skills, health, safety, access, employment, environment and housing.

14.2.19 The Plan also contains policies intended to promote and to realise the potential of Outer London. Policy 2.6 seeks to ensure that the quality of life in outer London is enhance for both present and future residents. In particular, Policy 2.7 identifies the need to address constraints on economic growth in outer London by enabling existing sources of growth, increasing outer London’s attractiveness to new sectors which can contribute to a “step change” in employment, promoting key clusters of activity, ensuring the promotion of outer London visitor attractions and the capacity of large scale commercial leisure in north London, ensuring that developments address the needs of areas for regeneration, and ensuring that appropriate weight in decision making is given to the economic benefits of business and residential development, and identifying and addressing local pockets of deprivation, and especially the strategic priorities identified in the Plan as regeneration areas.

14.2.20 The Upper Lee Valley is specifically identified as having a strategic function of greater than sub-regional importance in terms of leisure/tourism/arts/culture/sports.

14.2.21 Paragraph 2.35 states that “there is considerable scope for growth in the leisure, cultural and visitor economy sectors with scope for encouragement of cultural quarters in Outer London – particularly in town centres, the promotion, diversification and tighter management of the night time economy and possible potential for very large-scale commercial leisure facilities’.

14.2.22 The need for more and better quality homes provided as part of mixed and balanced communities is another key focus for the London Plan. Policy 3.9B states that ‘a more balanced mix of tenures should be sought particularly in neighbourhoods where social renting predominates and there are concentrations of deprivation’.

14.2.23 The London Plan highlights that sports and recreation facilities are important parts of the social infrastructure offer which provide a range of social and health benefits for communities and neighbourhoods. Policy 3.19A notes that The Mayor’s Sports Legacy Plan aims to increase participation in, and tackle inequality of access to, sport and physical activity in London particularly amongst groups/areas with low levels of participation.

14.2.24 Additionally, Policy 4.6A states that “the Mayor will, and boroughs and other stakeholders should, support the continued success of London’s diverse range of arts, cultural, professional sporting and entertainment enterprises and the cultural, social and economic benefits that they offer to its residents, workers and visitors”.

Housing

14.2.25 The need for greater levels of housing delivery is a key priority at all spatial levels. The recently adopted London Plan (including Further Alterations) sought to take into account the higher than anticipated levels of population growth across the capital and as a result revised borough housing targets as well as the
minimum targets set for Opportunity Areas.

14.2.26 Policy supports the provision of a range of homes of a range of types, sizes and tenures in order to meet a variety of needs and in order to create mixed and balanced communities. There is also greater emphasis on the delivery of homes as part of mixed use development and at higher densities, particularly in Opportunity Areas and where there are high PTAL ratings. This approach has been reiterated in the recently published Draft Housing SPG (2015) which seeks to reflect the changes in housing standards at a national level which came into force in April 2015 and also to reflect and build upon the updated policies of the London Plan 2015.

14.2.27 The overriding aim of the GLA’s London Housing Strategy (2014) is to “increase the supply of housing of all tenures and to ensure that these homes better support London’s continued economic success”. It set out ambitious plans to increase supply “to levels not seen since the 1930s” to enable all Londoners access to decent and affordable homes.

14.2.28 Policy P1 sets out targets to deliver 42,000 new homes per annum, with at least 17,000 of these being affordable and 5,000 for long-term market rent.

14.2.29 The strategy also sets out a commitment that all new homes should “meet high design standards, with minimum space standards and should be designed to be accessible and adaptable for people at all stages of their lives”.

14.2.30 The need to increase the supply of good quality homes in the Private Rented Sector is highlighted.

14.2.31 There is also greater recognition of the need to remove barriers to housing delivery which has resulted in the introduction of initiatives such as Housing Zones. Housing Zones were announced in 2013 and to date 15 zones have been announced, including Tottenham in the London Borough of Haringey. Delivery of housing in these areas will be supported by a menu of planning and financial measures.

14.2.32 The Upper Lee Valley Opportunity Area Planning Framework (OAPF) (2013) reiterates the policy priority for a range of homes to be delivered but recognises that the precise proportion of family housing may vary from site to site determined by criteria such as ‘local character, existing built form, flood risk, proximity to social infrastructure and to parks and open spaces’ (pg.28).

Economic Development

14.2.33 Following the General Election of 2010, the Government committed to establishing local enterprise partnerships (LEPs) to replace the Regional Development Agencies (RDAs). The first LEPs were established in April 2011 and there are now 39 across England including the London Enterprise Panel. The purpose of the LEP is to advise the Mayor of London on action to support and promote London’s economic development and wealth creation, including through its regeneration, housing, skills and other social or environmental improvement.

14.2.34 In April 2013, the LEP published its Jobs and Growth Plan which identified a series of aims and recommendations based around the following priorities:

- Raise skill levels and increase employment opportunities to ensure Londoners can compete for London’s job needs;
- Champion small and medium sized enterprises to support and grow businesses;
- Support the digital creative, science and technology sectors to position the capital globally as a world leading hub;
- Encourage infrastructure investment into London to keep the city moving and functioning.

14.2.35 In a more recently published report – **London 2036: An Agenda for Jobs and Growth (2014)** – the LEP identified the current challenges facing London in terms of its economic growth. These challenges include: a large infrastructure gap across multiple areas; poor levels of inclusion as lower-skilled workers compete in a highly competitive labour market; uneven development across the city; and limited capacity to invest and deliver.

14.2.36 The London Plan highlights the need to maintain the economic strength of central London but also build on the potential for Outer London to play a more integral role. There is recognition of the need to support existing sectors of the economy but also encourage growth in emerging sectors in areas through supporting: London as a research location; higher and further education; the delivery of a range of workspaces; the development of green enterprise districts; and the evolution of London’s science, technology, media and telecommunications (TMT) sector.

14.2.37 Underpinning all of this is an objective to ensure that Londoners are able to access jobs and other opportunities within their city. Policy 4.12 of the London Plan seeks to improve employment opportunities for Londoners, remove barriers to employment and progression and tackle low participation in the labour market.

14.2.38 The London Plan makes reference to the objectives of the Mayor’s Economic Development Strategy which identifies the following objectives:

- Tackle worklessness and get more Londoners into work;
- Address the root causes of low skills;
- Promote equality and tackle deprivation;
- Ensure more effective education, training and employment support for all;
- Help people get into work, stay in employment and progress their career; and
- Provide more personalised support and improve delivery.

14.2.39 The **Upper Lee Valley Opportunity Area Planning Framework (2013)** reflects the jobs targets set out within the London Plan and indicates that by 2031, the area could deliver over 15,000 new jobs across a range of industries and a green industrial hub creating greater learning and employment opportunities. Key economic sectors of focus in the OAPF include: sport and recreation; visitor economy; knowledge economy; and logistics, distribution and advanced manufacturing sectors.

**Community and Social Infrastructure**

14.2.40 The **GLA Supplementary Planning Guidance (SPG) on Shaping Neighbourhoods: Play and Informal Recreation (2012)** document provides guidance on the need for adequate provision of playspace in new residential developments in London. Specifically, it sets a target of providing at least 10sqm of playspace per child for new housing developments.
14.2.41 In accordance with London Plan Policy ‘3.6 - Children and Young People’s Play and Informal Recreation’, new developments that will include housing should make provision for playspace. This provision should normally be made on-site, especially for children under 5 or in close proximity to the site for older children, and be in accordance with the Local Development Framework play policies for the area.

14.2.42 Wherever possible, neighbourhoods should be child-friendly and the public realm should be safe, welcoming and enjoyable for children and young people.

14.2.43 The GLA Social Infrastructure SPG (2015) seeks to provide guidance on the implementation of London Plan policies (particularly Policy 3.16) which relate to the delivery of social infrastructure. There is recognition that planning for social infrastructure in London is complex with a changing service commissioning and delivery landscape, an expanding population and an increasingly complex demography. The SPG encourages London boroughs to make regular assessments of need and highlights that housing development particularly in Opportunity Areas / Intensification Areas / Areas for Regeneration will place significant pressure on existing social infrastructure. The co-location of social infrastructure not only with housing but with other social infrastructure uses is identified as a cross-cutting theme and is an important consideration in the context of increasing housing targets and the need to make the most efficient use of land whilst ensuring the long-term funding of facilities.

14.2.44 Great importance is placed on ensuring that sufficient choice of school places is available to meet the needs of existing and new communities. New sites are required to be secured, particularly in Opportunity Areas, Intensification Areas and areas subject to large residential development. Key considerations in identifying new school sites include: accessibility by public transport, population growth, existing educational performance and known parental demand for the creation of free schools. New schools are expected to consider the options for co-location of facilities, sharing facilities and cross-subsidising school facilities with residential development (Policy 3.18).

14.2.45 The provision of sports facilities is challenging in the context of scarcity of public funds and, therefore, maximising sports facility use is crucial. This could include the shared use of existing sports facilities to reduce demand for new provision. A similar approach is suggested in respect of faith buildings i.e. the provision of multi-faith prayer facilities that meet the needs of a number of faith groups.

Local Planning Policy

Current Planning Policy

14.2.46 The Haringey Local Plan Strategic Policies document (formerly the Core Strategy) was adopted by the Council in March 2013, and sets out a vision and key policies for the future development of the borough up to 2026 including specific policies on employment and economic development, housing and community facilities. In terms of site-specific policy, this document also outlines (in Policy SP1: Managing Growth) the redevelopment of the White Hart Lane area.

14.2.47 Policy SP1 states that Haringey’s growth will focus on the most suitable locations to meet and exceed housing targets in Growth Areas and Areas for Change (including Northumberland Park). Northumberland Park would deliver a total of 410 residential units by 2026, and the High road would deliver 623 units. The policy recognises that Northumberland Park suffers from a poor quality street scene, deprivation and labour market inequalities, a lack of green space, high crime, low educational attainment and a high concentration of social rented housing. Aspirations for the area include a ix of uses including stadium
redevelopment, provision of retail and leisure uses and appropriate contributions to open space, community facilities, regeneration initiatives and employment and training schemes.

14.2.48 Policy SP2 (Housing) aims to make full use of Haringey’s capacity to deliver its target for new homes from 2011-2021, including adequate provision of lifetime homes, affordable housing and a mix of tenures.

14.2.49 Policy SP8 and 9 (Employment; Skills and Training; Access to jobs) outline the Council’s commitment to protect employment in the borough including supporting local employment and regeneration aims, and specifically enabling Regeneration Areas to provide a mix of uses. Policy SP9 encourages the facilitation of training opportunities, particularly in areas of high unemployment, and to support new and expanding employment sectors. The success of this policy should be measured against the proportion of people claiming out-of-work benefits, with low or no qualifications, and the number of people accessing work having been long-term unemployed.

- Policies SP13, 14, 15 and 16 set out the Council’s approach to community facilities, including health, education, open spaces, play facilities and leisure. The overarching approach is to ensure that where development increases the demand for community facilities and services, that it makes appropriate contributions towards providing new (or improving existing) facilities. Key points include:
  - Enhance areas of identified open space deficiency and deliver key open space infrastructure programmes as set out in the Infrastructure Delivery Plan, monitored through applications submitted within areas of deficiency with proposed measures to mitigate deficiencies;
  - Deliver new health infrastructure, including that required in Haringey’s growth areas and areas with GP deficiency against the benchmark, monitored through (for example) the number of residents per GP, health inequalities of vulnerable groups, and health indicators also contained in the Joint Strategic Need Assessment.
  - Protect, expand and enhance culture and leisure facilities throughout the Borough, and improve access to culture leisure and sports facilities particularly in areas of deficiency. Measures to monitor this include level and type of sports facility usage and library visits per 1,000 population.
  - Address deficiencies of community infrastructure and deliver key infrastructure as set out in the Infrastructure Delivery Plan (see 14.2.63 below). Deliver additional space for community use and provision of additional school places.

14.2.50 Additionally, Haringey Council’s emerging Economic Development and Growth Strategy (2015) will be relevant to the Project as it identifies proposals to secure significant investment of £1bn in Tottenham’s growth.

14.2.51 Haringey’s Joint Strategic Needs Assessment (JSNA) (2012) bring together a number of related needs assessment covering several elements of health – including child poverty-related needs, dental health, emotional wellbeing, older people’s needs, and mental health needs amongst others.

14.2.52 Key issues across the borough are linked with deprivation and socio-economic factors that determine health and health outcomes. The level of health inequality within the borough is stark, with a 7.7 year difference in male life expectancy between the most and least deprived areas.

14.2.53 In Northumberland Park, the areas of pressure include:
High rate of A&E attendance;
Low life expectancy and high mortality rates;
Limited access to primary healthcare (GP practices) with many residents having to travel outside the ward;
High proportion of people on disease registers for conditions such as heart failure, diabetes, severe mental health issues, depression and kidney disease;
High birth rate and proportion of young people, sexual health and teenage pregnancy and low recorded birth weights, suggesting an increased need for services aimed at mothers, children and young people; and
The highest rates of smoking and obesity in the borough, with low levels of physical activity.

14.2.54 The JSNA summarises that facilities that respond to key inequalities should be prioritised in the areas that need them most, suggesting that opportunities to develop ‘safe play areas’, open gyms, maternity clinics, sexual health clinics and services for children and young people with complex health needs, among other facilities, should be explored.

14.2.55 The Haringey Health and Wellbeing Strategy 2012-2015 outlines three objectives; to give every child the best start in life; to reduce the gap in life expectancy between different areas of Haringey; and, to improve mental health and wellbeing. Currently, Haringey Council is undertaking a public consultation to change the focus of the strategic priorities to; Reducing obesity; Increasing healthy life expectancy; and, Improving mental health and wellbeing.

14.2.56 Haringey’s Community Buildings Review outlines the Borough’s role as a provider of community spaces of buildings, and identifies any key areas of deficiency, capacity constraint and need arising from voluntary and community organisations.

14.2.57 The Review finds that Haringey would benefit from wider access to community spaces for many smaller/newer community organisations, helping to improve utilisation, shared use, flexibility and the management of community buildings.

14.2.58 Haringey’s Open Space and Recreational Standards Supplementary Planning Document (2008) and Open Spaces Strategy (2006-2016) supports the Local Plan Strategic Policies, identifying areas deficient in public open space, play areas, and indoor sports facilities.

14.2.59 Much of Northumberland Park is identified as ‘outside of 400m pedestrian catchment’ from public open spaces, with the nearest being the Lee Valley to the east (although separated by the train line), Hartington Park to the south, and Bruce Castle Park to the west.

14.2.60 Northumberland Park ward performs well in terms of access to pitches in secured public use via Frederick Knight Sports Ground and Northumberland Park Sports Centre directly to the east of the Project Site.

14.2.61 This facility – part of the school – also includes a large swimming pool which results in much of the ward being deemed within sufficient access. In terms of indoor dry sports, there are two large indoor public sports halls (Middlesex University WHL and Tottenham Community Sports Centre) alongside the Frederick Knight Sports Ground, Northumberland Park School and a private facility at the Galaxy Gymnasium.
Part of the overarching regeneration strategy for Tottenham is the emerging **Tottenham High Road West Masterplan (2014)**, which has recently undergone consultation. It includes plans for the High Road area to deliver 1,200 new homes, public realm and transport improvements, community infrastructure, and to become a new sports and leisure destination for North London. It specifically identifies the catalytic effect of the development of a new stadium and associated development at Tottenham Hotspur FC.

The **Haringey Community Safety Strategy 2013-2017** seeks to address concerns about high crime levels and community safety in the Haringey area. It contains a set of six priorities to deliver a safer place for people to live, work and visit. Amongst the outcomes it wishes to achieve is a reduction of re-offending, with a focus on young people aged 16-24 who were found to be disproportionately more likely to be involved in a wide range of offences, including violent crimes, in the Haringey area.

**LB Haringey’s Infrastructure Delivery Plan (Appendix 4 of the Local Plan Strategic Policies)** identifies some specific physical infrastructure requirements for the borough and Northumberland Park. Combined with a review of existing socio-economic baseline and other needs and deficiency assessments, the following infrastructure could be required in Tottenham:

- Sports, leisure and open space facilities
- Education provision – including school places but also wider employability and training facility
- Local primary healthcare, public health or community support facility specific to key inequalities – e.g. mental health or maternity and post-natal care
- Safer Neighbourhoods centre
- Community / meeting / voluntary group space.

The **Haringey Economic Development and Growth Strategy (2015)** outlines how the borough will secure economic growth in the context of London’s economy, highlighting the importance of inward investment and aiming to secure more than £1bn in new investment in the next three years, concentrated in Tottenham.

The specific areas identified for new opportunities include:

- Harnessing the talent of residents, through investment in skills, different types of education and training and children’s services as well as better informing residents of the opportunities available;
- Increasing the number of skilled jobs in Haringey, by marketing Haringey as a location for expanding businesses and entrepreneurs;
- Reversing the decline of high streets and town centres; and
- Investing in infrastructure (which includes transport, digital connectivity, accommodation, social infrastructure and planning and regulation).

Through these channels, the Council has targeted 1,100 people supported into work, 200 young people taking up apprenticeships, 1,235 new jobs created and 50 new business established by 2018. Longer term plans include achieving full employment in the borough by 2030, along with increases to earnings in line with the London average for lower quartile earners, and improving the proportion of young people attaining NVQ 3/4 qualifications by 5%.
14.2.68 The Tottenham Strategic Regeneration Framework and Delivery Plan (2014) outlines the strategies that will be used to revitalise Tottenham through seven areas over the next 20 years:

- World-class education and training, including working with both existing schools and partners and new providers;
- Improved access to jobs and business opportunities, including attracting major investment in successful business sectors;
- A different kind of housing market – responding to the fact that demand is outstripping supply, and improving housing and neighbourhood quality by providing a range of housing in a range of tenures and prices particularly in Northumberland Park;
- A fully connected community with even better transport links;
- A strong and healthy community, particularly for young people;
- Great places, including improvement to the physical environment; and
- The right investment and high quality development.

14.2.69 Specific visions are outlined for the High Road West / Tottenham Hotspur and Northumberland Park areas, including creating a new residential neighbourhood, focusing on place-making, commercial opportunities and leisure, and encouraging a mixed and sustainable community.

14.2.70 Priorities of the Plan for Tottenham (2012-25) include developing enterprise, growth and attracting new businesses to the area, improving attractiveness with a better range of high quality public open space, shops and activities that will encourage residents to stay in the area and attract new visitors.

Emerging Planning Policy

14.2.71 A number of key planning policy documents in Haringey are currently under review following a consultation period in Spring 2015, including:

- Proposed Alterations to Haringey’s Adopted Strategic Policies;
- The Development Management Development Plan Document;
- The Site Allocations Development Plan Document; and

14.2.72 Proposed Alterations to Haringey’s Adopted Strategic Policies were consulted on in early 2015, and include amendments that respond primarily to changes in National (e.g. Housing Zone) and London-wide policy and employment, population and household projections, and the findings of the SHLAA that was used to inform the most recent London Plan. The key amendments to strategic policies include:

- Policy SP1 – to include the promotion of development in North Tottenham (including Northumberland Park, the redevelopment of Tottenham Hotspur Football Stadium and High Road West) and to revise the provision of new homes in strategic housing locations from 5,000 to 13,000 (North Tottenham is now a Growth Area rather than an Area for Change);
- Policy SP2 – to review the proportion of affordable housing required in development from 50% to 40% and re-distribute the affordable tenures within this; and to highlight Northumberland Park as a priority area of need for housing estate improvement.
14.2.73 The “preferred option” Development Management DPD includes a number of policies related to development, housing, open space, employment and community infrastructure.

14.2.74 Policies DM16 and 19 (Housing Supply; Affordable Housing) support proposals for new housing to sites allocated for residential development including mixed use residential development, within the Site Allocations Local Plan and Area Action Plans. Policy DM17 considers that housing mix should have regard to individual site circumstances and character, and states that the Council “will not support mono-tenure developments or proposals which contain a mix exclusively made up of 1 or 2 bedroom units unless they are part of larger developments or within neighbourhoods where such provision would help to address existing imbalances with regard to housing choice”

14.2.75 Policy DM2(C and D) promote the importance of healthy and inclusive, secure environments through design standards including compliance with ‘secured by design’ principles. The policy on inclusive environments is closely aligned to the requirements of the GLA’s SPG Accessible London: Achieving an Inclusive Environment, promoting a high quality, inclusive, accessible environment for visitors and residents including families with small children and older people whose mobility is impaired.

14.2.76 Policy DM26 requires that all residential developments in Areas of Open Space Deficiency, and in wads which fall below the Borough-wide target of open space of 1.64ha per 1,000 population to provide new open space and/or make financial contributions to enable the provision of new open spaces or improvements to the accessibility and quality of existing open space.

14.2.77 In terms of economy/employment, Policy DM50 (Facilitating Site Regeneration and Renewal) supports mixed use development within designated Regeneration Areas, and where there is no net loss of employment floorspace. In Town Centres, Policy DM53 highlights that proposals should have active frontages at ground floor level, and upper levels with residential or employment uses.

14.2.78 Policy DM57 (Access to Jobs and Training) stipulates that the Council will seek planning contributions to facilitate opportunities for local employment and training, including apprenticeships and work experience placements in order to reduce imbalances between Haringey and other areas of London. This applies to both construction and end-use employment opportunities, and is linked to sustainable commuting principles on co-location of homes and jobs.

14.2.79 Community infrastructure is managed by Policies DM58 and DM59, which states that proposals for new and extended facilities will be supported subject to their ability to respond to local need, and should take into account the Council’s Infrastructure Delivery Plan.

14.2.80 LB Haringey consulted on its Tottenham Area Action Plan in January 2014, with a strong focus on delivery and implementation in-line with Government guidance for areas of significant change. The AAPs are consistent with Haringey’s 2013-2026 Local Plan and Upper Lee Valley OAPF, and emerging local DPDs on Site Allocation and Development Management.

14.2.81 The AAP identifies the following socio-economic characteristics for Tottenham:

- Tottenham’s population is young, ethnically and culturally diverse and economically disparate;
- Unemployment – and youth unemployment in particular – is high;
• Crime and anti-social behaviour are key concerns.

14.2.82 It also recognises the scale of change – with 10,000 new homes and 5,000 new jobs, a reinvigorated high street and leisure destination at High Road West, set in the contest of major transport improvements secured through the Government's £500m borrowing guarantee scheme to support housing and transport infrastructure in Tottenham.

14.2.83 The following challenges to achieving successful regeneration are outlined:

• Underperformance of the High Road in terms of commercial and retail activity;
• Barriers to movement in all directions which has meant the physical structure of Tottenham has lost contact with the open space of the Lee Valley;
• Poor streetscape and run-down buildings;
• The lack of a strong ‘sense of place’ in Northumberland Park and High Road West;
• Poor transport infrastructure in North Tottenham; and
• The need to improve the quality and amount of social infrastructure.

14.2.84 The Northumberland Park AAP identifies Northumberland Park, and the area around Tottenham Hotspur in particular, as a sports and leisure destination (forming part of the wider commercial and residential development plans. Public realm improvements to bring railway arches back into use and redevelop White Hart Lane station are an important aspect of any redevelopment.

14.2.85 Employment and education are identified as catalysts for neighbourhood regeneration, alongside the major transport improvements led by the West Anglia Line.

14.2.86 A driver of change for Tottenham will be the Council’s Housing Investment and Estate Renewal Strategy, part of which is based on fixing previous poor public realm and estate design that has in part contributed to anti-social behaviour.

14.2.87 Wider indicative opportunities outlined in the AAP for Northumberland Park include:

• A focal area for cultural, sport and leisure activities;
• Visitor and recreational facilities; and
• Accessibility improvements.

14.2.88 The London Borough of Haringey is currently consulting on a Draft Corporate Plan (Building a Stronger Haringey Together) for the period 2015-2018. This Plan is relevant as it will aim to drive growth and employment, by securing infrastructure and creating environmental conditions that support investment, and focuses growth in homes and jobs within Tottenham specifically.

14.3 Assessment Methodology

14.3.1 The approach to socio-economic impact assessment is based on a defined impact area and baseline conditions for housing, population/demographic, economic and community facilities, identification of a range of receptors within these elements, and a quantitative and qualitative assessment of the impacts of various elements of the Project on people and the economy.
14.3.2 The scale of significance described below, together with expert judgement, would be used to assess the potential and residual impacts of the Project against the baseline conditions. The assessment process will aim to be objective and quantify the impacts as far as possible – however some impacts can only be evaluated on a qualitative basis.

14.3.3 Impacts will be direct or indirect; temporary or permanent; and short, medium or long-term.

14.3.4 While having regard to the generic assessment framework outlined earlier in this report, the following terms have been used to define the significance of the impacts identified, based on the magnitude of change as a deviation from the baseline conditions and dependent on the sensitivity of the receptor to change:

- **Major impact**: Where the Project could be expected to have substantial impact (either positive or negative) on local residents, new residents or existing community facilities. These effects are likely to be important considerations at a regional or district scale.

- **Moderate impact**: Where the Project could be expected to have a noticeable impact (either positive or negative). While important at a local scale, these are not likely to be key decision making issues.

- **Minor impact**: Where the Project could be expected to result in a small, barely noticeable impact on local or new residents and community facilities.

- **Neutral**: No discernible impact as a result of the Project.

Consultation

14.3.5 Formal pre-application discussions have been held the Council, and the GLA since mid-2014, with weekly meeting held since May 2015 where at a number of planning application requirements and environmental assessments were discussed. Community consultation was undertaken in the run up to the submission of the application which is outlined in the Statement of Community Involvement (SCI) (which accompanies the planning application documentation).

Construction

14.3.6 Construction impacts have been assessed using standard ratios of construction employment to output, assuming an average output per employee per year.

14.3.7 The Project will involve a variety of construction techniques and methods and it is not possible, at this stage, to assess accurately specific skill types and the proportion of employment which will be on or off site.

Operation

14.3.8 Due to the variety of different uses proposed within the Project, a number of different approaches have been used to quantify the effects of the impacts on different receptors.

Employment

14.3.9 In relation to use of the Stadium, a number of assumptions have been made on the advice of the Club, and based on evidence from other stadium developments including the Emirates Stadium and Wembley Stadium. This would include the provision of match-day, non-matchday, hospitality and permanent office-
14.3.10 For other operational employment within the commercial, hotel, retail and leisure uses within the Project, standard floorspace-to-job ratios have been used. In order to identify the net employment effects, the baseline employment level (employment within existing uses) has been estimated using information provided by the Club’s 2014 Annual Report.

14.3.11 Economic impacts have been referred to in terms of their additionality where applicable, with reference to methodology outlined in the HCA’s Additionality Guide (4th Edition, 2014).

Visitors and Expenditure

14.3.12 Average annual visitor numbers, and associated expenditure, have been estimated using a range of sources and split between matchday and non-matchday (non-football) events and uses.

14.3.13 For football events, the number of annual matchday visitors has been estimated using the average attendance and number of home games over the last 5 seasons. There are a number of metrics used by economists and researchers to estimate the amount of time and money spent inside and outside football stadia by supporters on matchdays on food, drink and entertainment. Local spending estimates from a number of studies range from around £2 to £10 per supporter, with around 60% of supporters spending money outside the stadium in the local area. More optimistic estimates of spending, for example that used in Brentford FC’s recent “Community Benefits Statement” appended to their planning application for a new stadium, estimate that this figure could be up to £17 per patch day, with around 63% being spent outside the stadium in the local area.

14.3.14 Recent research by Deloitte into a match at the current stadium in April 2015 estimated that fans visiting THFC from elsewhere in London (31% of visitors) spend around £34 per visit in the Wider Impact Area (see 14.3.24 below) and £5 elsewhere in London, while those from elsewhere in the UK (55% of visitors) spent an average of £20 in the Wider Impact Area and £10 elsewhere in London.

14.3.15 Visitors and expenditure for non-football events, including other periodical sporting events and concerts, the Tottenham Hotspur Experience and extreme sports centre have been estimated based on the above methodology where applicable, using additional visitor estimates where data is available and feasibility studies undertaken by the Club - for example based on current take-up of conferencing facilities, and studies into the economic impacts of specific events (for example, using research by Deloitte into the economic effect of the NFL series at Wembley Stadium).

14.3.16 Hotel visitors have been estimated based on a 5+ year average occupancy of hotel rooms in London and revenue per available room estimated by PWC (2014/15).

14.3.17 Household expenditure generated by the proposed residential element buying food and services locally will be based on the average household expenditure in London per week (ONS Family Spending Survey 2012).

14.3.18 Expenditure by employees in the local area will be estimated based on survey information identifying average spend per day, carried out by research agency Loudhouse for Visa Europe.
Population and Community Facilities

14.3.19 The methodology for population modelling, including child yield assessments, can be based on a number of data sources including Census moving groups data, Council-defined population yields, GLA-defined yields and population forecasts, CORE Lettings data from DCLG, and DMAG / Wandsworth population models. Quod uses these and other datasets to develop its own propriety model.

14.3.20 Assessment of the effect of the Project on current capacity in schools has been based on information from the Local Education Authority’s School Admissions Documents (2015/16), and 2014 Annual Schools Census data.

14.3.21 Effects on the availability of health facilities (GP surgeries, pharmacies, dentists, opticians and acute care) in the local area have been assessed using published NHS data, cross-referenced with a register of healthcare facilities published by local health authorities and Haringey Council.

14.3.22 Community and social impacts have been assessed in terms of community access to the stadium and any measures taken to design out crime described in the Design and Access Statement, which accompanies the planning application documentation. A full audit of existing community facilities and an assessment of the level of demand for community facilities resulting from the Project has been undertaken.

Geographical Scope

14.3.23 Socio-economic baseline data is usually collected and presented on an administrative geography scale. The baseline assessment for this Chapter considers the current (and consented) uses within the Project Site boundary, and the impacts of the current Stadium uses on the surrounding area.

14.3.24 The immediate ward area (Northumberland Park Ward) is used as the basis of comparison of baseline conditions against an ‘Inner Impact Area’ level, including Northumberland Park and surrounding wards (Seven Sisters, St Ann’s, Tottenham Green, Tottenham Hale, Bruce Grove, West Green, White Hart Lane); and a ‘Wider Impact Area’, based on the Boroughs of Haringey and Enfield, and where appropriate against broader London as a whole.
14.3.25 Impacts on social infrastructure provision are assessed by looking at reasonable travel distances/catchments relevant to specific types of facility. For general community facilities, healthcare, day nursery and primary education provision has been assessed within 1km (about 10 to 15 minutes' walking distance) from the Project Site, and secondary education across the two Boroughs of Haringey and Enfield.

Cumulative Development

14.3.26 Cumulative socio-economic impacts may occur where economic and employment, housing, population and community facility / employment effects of committed development may occur during the operational phase. There are a number of ways in which development in the immediate and wider area surrounding the Project Site could contribute to the socio-economic impacts generated by the Project including (inter alia):

- Residential development has the potential to accommodate new resident populations in the area. This could affect demand for the provision of public services and capacity of community facilities; and
- New commercial floorspace would be expected to provide economic benefits through job creation and spending.
14.3.27 Cumulative effects have been assessed by identifying (from the schedule of developments agreed between the Club and LB Haringey) extant planning permissions that qualify as 'major development' within the Inner Impact Area (Northumberland Park and surrounding wards (Seven Sisters, St Ann's, Tottenham Green, Tottenham Hale, Bruce Grove, West Green, White Hart Lane, and Upper Edmonton).

14.3.28 Only 'major developments' have been included in the cumulative impact assessment due to the comparative size of the Project – it is expected that any impact of a smaller development would not materially affect the significance of the effects already assessed as part of the Project on its own. Other major developments will have a similar scale of effects which are therefore more likely to influence the cumulative or combined effects in the area.

14.3.29 In this instance, these are schemes which:

- Meet LB Haringey’s definition of 'Major Development' – e.g. schemes comprising 200+ residential units and/or provides 10,000+ sqm of floorspace; or
- Are referable applications (Large Scale Development) to the Mayor of London (e.g. any development comprising or including 150+ residential units, and/or 15,000+ sqm of commercial floorspace – as defined by the Town and Country Planning (Mayor of London) Order 2008).

14.3.30 In addition, information on policy-committed development proposals without planning applications / permissions (i.e. for High Road West and Northumberland Park Regeneration) has been identified through a review of the Tottenham Strategic Regeneration Framework.

14.3.31 Information on housing provision and commercial floorspace provision has been sought from the planning application documents and policy documents (in the case of High Road West and Northumberland Park Regeneration) from relevant schemes identified in Chapter 3.

Limitations to the Assessment

14.3.32 All socio-economic effects are based on the set socio-economic baseline at a single point in time, as the production of future baseline is not possible to a good degree of certainty.

14.3.33 The scale of effects also differs based on the element of the baseline – for example, the effects on Primary Schools are assessed in the area within 1km of the Project Site as this is the distance that children resident within the Project Site are likely to walk to school (approx. 10-15mins), whereas at secondary school level the distance travelled by pupils is much greater and a Wider Impact Area is used.

14.4 Baseline Conditions

Site Context & Previous Consents

14.4.1 The Project Site is located at the northern end of Tottenham High Road in the London Borough of Haringey, close to the border with the London Borough of Enfield. The High Road runs for approximately 2.5km from Seven Sisters in the south, with a fairly continuous shopping frontage which extends north into Enfield where it is called Fore Street.

14.4.2 The area on either side of the High Street is predominantly residential; including both terraced housing
and larger purpose built mainly social housing blocks. It also contains industrial and distribution uses, particularly towards the northern end. The area is bounded to the east by railway lines, the Lea Valley Regional Park and larger scale industrial uses. This buffer, which effectively runs from the Thames in the south to the M25 in the north provides major social and physical severance from the Borough of Waltham Forest on the eastern side of the park.

14.4.3 The Lee Valley was once one of London’s main industrial locations but has been in decline since the 1960s with major reductions in manufacturing employment. This has impacted severely on the economic vitality of the area and underlies the socio-economic baseline described below.

Demographic Baseline

14.4.4 The Project Site is adjacent to Tottenham High Road in Northumberland Park ward. Northumberland Park has a relatively young and ethnically diverse population, with over a quarter of residents aged under 16 years, and only 8% over 65 years. The wider area in Tottenham also has a younger age profile than Haringey, Enfield and London averages. London’s population has continued to become more ethnically diverse, and this has accelerated in Northumberland Park and Tottenham where Black, Asian and Minority Ethnic (BAME) groups make up 61% and 52% of the population respectively.

14.4.5 Annual population growth has been around the same rate in Northumberland Ward and Tottenham as London as a whole at 1.4% per annum since 2001. Over the 20 years from 2011 population growth is predicted to be significantly higher in the local area in comparison with the growth projected for the Wider Impact Area and London overall.

Table 14.1 – Demographic Baseline Summary (Source: 2011 Census; GLA 2014 Round SHLAA Capped Population Projections – capped)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Northumberland Park</th>
<th>Tottenham - Inner Impact Area</th>
<th>Haringey and Enfield - Wider Impact Area</th>
<th>London</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Population</td>
<td>14,429</td>
<td>115,965</td>
<td>567,392</td>
<td>8,173,941</td>
</tr>
<tr>
<td>Growth Rate (p.a. since 2001)</td>
<td>1.4%</td>
<td>1.7%</td>
<td>1.6%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Population Projections 2031</td>
<td>34%</td>
<td>24%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>(2011 base)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BAME Residents</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>39%</td>
<td>48%</td>
<td>61%</td>
<td>60%</td>
</tr>
<tr>
<td>Mixed</td>
<td>7%</td>
<td>7%</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>Asian</td>
<td>8%</td>
<td>11%</td>
<td>10%</td>
<td>18%</td>
</tr>
<tr>
<td>Black</td>
<td>40%</td>
<td>28%</td>
<td>18%</td>
<td>13%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
<td>6%</td>
<td>5%</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Age Profile</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-15</td>
<td>27%</td>
<td>23%</td>
<td>22%</td>
<td>20%</td>
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<tr>
<td>16-24</td>
<td>13%</td>
<td>14%</td>
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EIA Environmental Statement
Volume 2: Main Report

<table>
<thead>
<tr>
<th>Measure</th>
<th>Northumberland Park</th>
<th>Tottenham - Inner Impact Area</th>
<th>Haringey and Enfield - Wider Impact Area</th>
<th>London</th>
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<tbody>
<tr>
<td>25-49</td>
<td>40%</td>
<td>43%</td>
<td>41%</td>
<td>42%</td>
</tr>
<tr>
<td>50-64</td>
<td>13%</td>
<td>12%</td>
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<td>14%</td>
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<tr>
<td>65+</td>
<td>8%</td>
<td>8%</td>
<td>11%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Economic and Employment Baseline

14.4.6 Residents of the Inner Impact Area are less likely to be economically active than residents of the Wider Impact Area or across London overall. The proportion of unemployed residents is also higher in Northumberland Park where 10% of working-age adults are unemployed, compared to 6% across the Wider Impact Area, and 5% across London as a whole.

14.4.7 A lower proportion of Northumberland Park ward and Inner Impact Area residents work in management/professional roles (27% and 34% respectively) compared to approximately half of residents in the Wider Impact Area and in London overall. Local residents are also more likely to have no qualifications, and less likely to have higher qualifications than residents living across London as a whole.

Table 14.2 – Economic/Employment Baseline Summary (Source: 2011 Census; ONS JSA Claimant Count, July 2015)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Northumberland Park</th>
<th>Tottenham - Inner Impact Area</th>
<th>Haringey and Enfield - Wider Impact Area</th>
<th>London</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Active</td>
<td>62%</td>
<td>66%</td>
<td>70%</td>
<td>72%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>10%</td>
<td>7%</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>Inactive – Retired</td>
<td>7%</td>
<td>7%</td>
<td>9%</td>
<td>8%</td>
</tr>
<tr>
<td>Inactive – Student</td>
<td>10%</td>
<td>10%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Inactive – Home/Family</td>
<td>8%</td>
<td>6%</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>Inactive – Sick/Disabled</td>
<td>7%</td>
<td>6%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Inactive – Other</td>
<td>7%</td>
<td>5%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>JSA Claimant Count*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JSA Claimant Rate</td>
<td>5.7%</td>
<td>3.5%</td>
<td>2.5%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Total Claimants</td>
<td>560</td>
<td>2,940</td>
<td>9,700</td>
<td>111,800</td>
</tr>
<tr>
<td>JSA Claimants - Sought Occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sought Occupation – Management/Professional</td>
<td>20%</td>
<td>23%</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>Sought Occupation – Admin/Skilled/Personal/Sales</td>
<td>59%</td>
<td>57%</td>
<td>64%</td>
<td>66%</td>
</tr>
<tr>
<td>Sought Occupation – Process/Elementary</td>
<td>19%</td>
<td>19%</td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td>Sought Occupation – Not</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
<td>3%</td>
</tr>
</tbody>
</table>
There are just over 8,000 jobs in Northumberland Park ward and approximately 29,000 work in the Inner Impact Area. Larger proportions of jobs in the local area are in the manufacturing, wholesale, accommodation and food services sectors compared to the Wider Impact Area and in London overall. A lower proportion of jobs in the local area are in professional, scientific and technical and business admin sectors.

**Table 14.3 – Local Area Jobs Baseline Summary – Key sectors in the local area (Source: Business Register and Employment Survey, 2013)**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Northumberland Park</th>
<th>Tottenham - Inner Impact Area</th>
<th>Haringey and Enfield - Wider Impact Area</th>
<th>London</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodation / Food Services</td>
<td>25%</td>
<td>10%</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>Wholesale / Retail</td>
<td>20%</td>
<td>20%</td>
<td>19%</td>
<td>12%</td>
</tr>
<tr>
<td>Arts, Entertainment, recreation &amp; other services</td>
<td>13%</td>
<td>6%</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>Education / Health</td>
<td>12%</td>
<td>20%</td>
<td>25%</td>
<td>18%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>11%</td>
<td>8%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>Professional / Financial / Property / Business admin</td>
<td>10%</td>
<td>14%</td>
<td>21%</td>
<td>41%</td>
</tr>
</tbody>
</table>

In terms of employment trends over time, although all spatial areas have seen absolute growth in jobs over the last 30 years, this growth has not been even across industries. In particular, the share of manufacturing jobs in the local economy at both ward and Inner Impact Area level has fallen significantly. In Northumberland Park ward manufacturing jobs made up almost half of all jobs in 1984, but by 2013 this share had decreased to just 11%. Though the decreasing significance of the manufacturing industry has been a London-wide (and UK) economic trend, the effect on the local area has been particularly significant due to the much larger proportion of local jobs that were in manufacturing in the 1970s and 80s.

**Table 14.4 – Share of total employment in Manufacturing 1984 and 2013 (Source: BRES/ABI)**

<table>
<thead>
<tr>
<th>Proportion of total employment</th>
<th>Northumberland Park</th>
<th>Tottenham - Inner Impact Area</th>
<th>Haringey and Enfield - Wider Impact Area</th>
<th>London</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing 1984</td>
<td>49%</td>
<td>41%</td>
<td>28%</td>
<td>16%</td>
</tr>
<tr>
<td>Manufacturing 2013</td>
<td>11%</td>
<td>8%</td>
<td>5%</td>
<td>2%</td>
</tr>
</tbody>
</table>

*Due to changing ward boundaries, Northumberland Park’s boundaries in 1984 represent a slightly larger area than the size of the...
study ward in 2013 (Northumberland ward did not exist in 1984 and data is based on 1984 Coleraine and Park ward boundaries)

**Housing Baseline**

14.4.10 Almost half of households in Northumberland Park ward live in social rented homes – this is a higher proportion compared to wider scales. There is also a higher proportion of purpose-built flats, and a lower proportion of houses in Northumberland Park ward in comparison with the other study areas. Levels of overcrowding are generally higher in the local area compared to the Wider Impact Area and London as a whole – this is particularly pronounced in rented homes (both social and private rented tenures).

**Table 14.4 – Housing Summary (Source: Census, 2011)**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Northumberland Park</th>
<th>Tottenham - Inner Impact Area</th>
<th>Haringey and Enfield - Wider Impact Area</th>
<th>London</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodation Tenure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owned</td>
<td>21%</td>
<td>31%</td>
<td>49%</td>
<td>48%</td>
</tr>
<tr>
<td>Shared Ownership</td>
<td>3%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Social Rented</td>
<td>49%</td>
<td>37%</td>
<td>22%</td>
<td>24%</td>
</tr>
<tr>
<td>Private Rented</td>
<td>26%</td>
<td>29%</td>
<td>26%</td>
<td>25%</td>
</tr>
<tr>
<td>Accommodation Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purpose-built Flat</td>
<td>52%</td>
<td>36%</td>
<td>31%</td>
<td>38%</td>
</tr>
<tr>
<td>Other Flats</td>
<td>14%</td>
<td>19%</td>
<td>17%</td>
<td>15%</td>
</tr>
<tr>
<td>Whole house (Detached, Semi-detached, Terraced)</td>
<td>33%</td>
<td>46%</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>Levels of Overcrowding (bedrooms)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In all Homes</td>
<td>23%</td>
<td>21%</td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>In Privately Owned Homes</td>
<td>11%</td>
<td>9%</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>In Social Homes</td>
<td>24%</td>
<td>24%</td>
<td>21%</td>
<td>17%</td>
</tr>
<tr>
<td>In Private Rented Homes</td>
<td>31%</td>
<td>30%</td>
<td>21%</td>
<td>18%</td>
</tr>
</tbody>
</table>

**Deprivation**

14.4.11 Northumberland Park ward is the most deprived ward in London. In terms of employment measures, it is the third most deprived ward in London, and in terms of income it is the fifth most deprived. Haringey overall is the 11th most deprived local authority in England.
14.4.12 A comparison between levels of deprivation in the local area and the other spatial scales, including a breakdown of the six dimensions of deprivation included in the IMD analysis, is shown in Figure 14.2. Northumberland Park ward has higher levels of deprivation in terms of all six dimensions of deprivation compared to the wider spatial areas – though levels of deprivation in terms of income, housing, crime and employment are particularly high. Of LSOAs within Haringey that fall into the top 10% of deprived areas in the UK, 81% are located within the wards of the Inner Impact Area – indicating that high levels of deprivation are concentrated in the east of Haringey.
Figure 14.3: Indices of Multiple Deprivation 2010 - Inner Impact Area
Crime and Safety

14.4.13 In terms of crime and safety, Metropolitan Police data recording crime rates per 1000 of the population report generally higher incidences of crime in Northumberland Park ward compared to Haringey and London as a whole. Rates of violence against the person were the highest in the local area at 50 per 1,000 people for the 12 month period to June 2015 (Figure 14.5).
14.4.14 Haringey’s Community Safety Strategy (2013-2017) aims to set priorities and deploy resources effectively in order to make Haringey one of the safest boroughs in London. The report notes that crime levels across Haringey have fallen in recent years and are now roughly in line with London averages, and generally, personal robberies, serious violent crime and some types of anti-social behaviour tend to occur in areas around major transport hubs (Wood Green, Turnpike Lane, Bruce Grove and Seven Sisters stations). The report also states that 40% of all offences reported in the borough are committed by people aged 18-24.

14.4.15 Home Office statistics on football related arrests and banning orders state there were 25 arrests of Tottenham Hotspur supporters at home matches during the 2013-14 season – with the majority of arrests being made in relation to public disorder offences. This represents a slightly higher rate of arrests compared to the previous season when just 9 arrests were made at home matches. However, rates remain low representing approximately 4.3 arrests per 100,000 visitors across the season (which is broadly in line with the rates of arrests seen at other London clubs including Chelsea (4.6), Arsenal (3.8), West Ham (1.9) and Fulham (2.2)).
Summary

14.4.16 Northumberland Park ward is one of the most deprived areas in the country – with particularly high levels of deprivation in terms of income and employment measures. Deprivation is also relatively high across the broader Inner Impact Area with lower levels of economic activity, higher JSA claimant rates, and higher levels of residents with no qualifications compared to the Wider Impact Area and London as a whole. The local economy has seen significant restructuring over the last 30 years due to the impact of the declining manufacturing sector in this once thriving manufacturing area.

Social Infrastructure and Community Facilities

Childcare & Education

14.4.17 Nurseries in Haringey provide early years care and education for children aged from 6 weeks up to pre-school five year olds. There are three main types of provision: council nurseries, private nurseries and community nurseries. Within 1 km of the Project Site there are 7 operating nurseries registered with Ofsted – as shown in Figure 14.4 below.

14.4.18 In terms of primary provision, there are 10 primary schools, two infant and two junior schools within 1km of the Project Site. The location of these schools is also shown in Figure 14.4.

14.4.19 Based on Annual Schools Census data and 2015 admissions documents, the current combined capacity at these schools is approximately 3%, or 155 places. There is a surplus of just 2% (22 spaces) at reception level. Existing capacities of all schools within 1km of the Project Site are detailed in Table 14.6 below.

14.4.20 Meridian Angel Primary School (free school) opened in 2014 on Dyson’s Road, Edmonton. The school is currently 1FE, but will open a new school building in 2015, with an additional 1FE. The new school building will open with classes in each year from reception to year five, and will be located within the 1km study area on Ladysmith Road (close to the existing Meridian Angel Primary School building as shown in Figure 14.4 below).

Table 14.6 – Primary School Provision within 1km of the Project Site (Source: Annual Schools Census, 2015; LBH and LBE Schools Admissions Documents 2015)

<table>
<thead>
<tr>
<th>Map ref</th>
<th>School Name</th>
<th>Number on Roll</th>
<th>Capacity</th>
<th>Surplus Places</th>
<th>Surplus Capacity</th>
<th>Ofsted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Meridian Angel Primary School*</td>
<td>141</td>
<td>150</td>
<td>9</td>
<td>6%</td>
<td>N/a not yet inspected</td>
</tr>
<tr>
<td>2</td>
<td>Raynham Primary School</td>
<td>719</td>
<td>720</td>
<td>22</td>
<td>3%</td>
<td>Good (2013)</td>
</tr>
<tr>
<td>3</td>
<td>St John and St James Co/E Primary School</td>
<td>400</td>
<td>420</td>
<td>20</td>
<td>5%</td>
<td>Good (2014)</td>
</tr>
<tr>
<td>4</td>
<td>Devonshire Hill Primary School</td>
<td>414</td>
<td>420</td>
<td>6</td>
<td>1%</td>
<td>Good (2012)</td>
</tr>
<tr>
<td>5</td>
<td>Harris Primary Academy Coleraine Park</td>
<td>385</td>
<td>420</td>
<td>35</td>
<td>8%</td>
<td>Outstanding (2014)</td>
</tr>
<tr>
<td>6</td>
<td>Lancasterian Primary School</td>
<td>427</td>
<td>406</td>
<td>0</td>
<td>0%</td>
<td>Good (2013)</td>
</tr>
<tr>
<td>7</td>
<td>Lea Valley Primary School</td>
<td>420</td>
<td>420</td>
<td>0</td>
<td>0%</td>
<td>Good (2013)</td>
</tr>
<tr>
<td>8</td>
<td>Bruce Grove Primary School</td>
<td>410</td>
<td>420</td>
<td>10</td>
<td>2%</td>
<td>Good (2012)</td>
</tr>
</tbody>
</table>
14.4.21 Analysis of secondary school provision is carried out at a borough level to allow for pupil preference, and since it can reasonably be expected that secondary-age students are willing and able to travel further to attend school. There are 33 secondary schools across LBH and LBE. Existing capacities of these schools are detailed in Table 14.7, showing surplus capacity in spaces of approximately 10% across both boroughs.

Table 14.7 – Secondary School Provision in the London Boroughs of Haringey and Enfield (Source: Annual Schools Census, 2015; LBH and LBE Schools Admissions Documents 2015)

<table>
<thead>
<tr>
<th>Map ref</th>
<th>School Name</th>
<th>Number on Roll</th>
<th>Capacity</th>
<th>Surplus Places</th>
<th>Surplus Capacity</th>
<th>Ofsted</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Risley Avenue Primary School</td>
<td>620</td>
<td>630</td>
<td>10</td>
<td>2%</td>
<td>Good (2013)</td>
</tr>
<tr>
<td>10</td>
<td>Mulberry Primary School</td>
<td>630</td>
<td>630</td>
<td>0</td>
<td>0%</td>
<td>Good (2013)</td>
</tr>
<tr>
<td>11</td>
<td>St Paul’s and All Hallows CoE Infant School</td>
<td>173</td>
<td>180</td>
<td>18</td>
<td>10%</td>
<td>Good (2013)</td>
</tr>
<tr>
<td>12</td>
<td>St Paul’s and All Hallows CoE Junior School</td>
<td>225</td>
<td>240</td>
<td>15</td>
<td>6%</td>
<td>Good (2013)</td>
</tr>
<tr>
<td>13</td>
<td>St Francis de Sales RC Junior School</td>
<td>350</td>
<td>360</td>
<td>10</td>
<td>3%</td>
<td>Requires Improvement (2014)</td>
</tr>
<tr>
<td>14</td>
<td>St Francis de Sales RC Infant School</td>
<td>270</td>
<td>270</td>
<td>0</td>
<td>0%</td>
<td>Good (2014)</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>5,584</td>
<td>5,686</td>
<td>155</td>
<td>2.7%</td>
<td></td>
</tr>
</tbody>
</table>

14.4.22 The closest schools to the Project Site accepting secondary-age pupils are Tottenham UTC (college accepting secondary-age pupils in Years 10 and 11, and up to age 18), and Northumberland Park Community School, located on Trulock Road. The location of these schools is shown in Figure 14.6.
<table>
<thead>
<tr>
<th>Map ref</th>
<th>School Name</th>
<th>Number on Roll</th>
<th>Capacity</th>
<th>Surplus Places</th>
<th>Surplus Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Broomfield School</td>
<td>691</td>
<td>1150</td>
<td>459</td>
<td>40%</td>
</tr>
<tr>
<td>15</td>
<td>St Ignatius College</td>
<td>864</td>
<td>900</td>
<td>36</td>
<td>4%</td>
</tr>
<tr>
<td>16</td>
<td>Enfield Grammar School</td>
<td>891</td>
<td>900</td>
<td>9</td>
<td>1%</td>
</tr>
<tr>
<td>17</td>
<td>Oasis Academy Enfield</td>
<td>877</td>
<td>900</td>
<td>23</td>
<td>3%</td>
</tr>
<tr>
<td>18</td>
<td>Oasis Academy Hadley</td>
<td>847</td>
<td>1200</td>
<td>353</td>
<td>29%</td>
</tr>
<tr>
<td>19</td>
<td>Aylward Academy</td>
<td>1126</td>
<td>1200</td>
<td>74</td>
<td>6%</td>
</tr>
<tr>
<td>20</td>
<td>Nightingale Academy</td>
<td>627</td>
<td>900</td>
<td>273</td>
<td>30%</td>
</tr>
<tr>
<td>21</td>
<td>Harris Academy Tottenham</td>
<td>73</td>
<td>90</td>
<td>377</td>
<td>19%</td>
</tr>
<tr>
<td>22</td>
<td>Tottenham UTC</td>
<td>32</td>
<td>210</td>
<td>178</td>
<td>85%</td>
</tr>
<tr>
<td>23</td>
<td>Hornsey School for Girls</td>
<td>804</td>
<td>1080</td>
<td>276</td>
<td>26%</td>
</tr>
<tr>
<td>24</td>
<td>Highgate Wood Secondary School</td>
<td>1183</td>
<td>1215</td>
<td>32</td>
<td>3%</td>
</tr>
<tr>
<td>25</td>
<td>Northumberland Park Community School</td>
<td>1026</td>
<td>1050</td>
<td>24</td>
<td>2%</td>
</tr>
<tr>
<td>26</td>
<td>Fortismere School</td>
<td>1202</td>
<td>1215</td>
<td>13</td>
<td>1%</td>
</tr>
<tr>
<td>27</td>
<td>Gladesmore Community School</td>
<td>1223</td>
<td>1215</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>28</td>
<td>Woodside High School</td>
<td>809</td>
<td>810</td>
<td>1</td>
<td>0%</td>
</tr>
<tr>
<td>29</td>
<td>Alexandra Park School</td>
<td>1081</td>
<td>1080</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>30</td>
<td>Park View</td>
<td>1039</td>
<td>1080</td>
<td>41</td>
<td>4%</td>
</tr>
<tr>
<td>31</td>
<td>St Thomas More Catholic School</td>
<td>661</td>
<td>960</td>
<td>299</td>
<td>31%</td>
</tr>
<tr>
<td>32</td>
<td>Heartlands High School</td>
<td>968</td>
<td>945</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>33</td>
<td>Greig City Academy</td>
<td>868</td>
<td>1000</td>
<td>132</td>
<td>13%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td><strong>28,714</strong></td>
<td><strong>31,610</strong></td>
<td><strong>3,303</strong></td>
<td><strong>10.4%</strong></td>
</tr>
</tbody>
</table>
Healthcare Facilities

14.4.23 Existing healthcare facilities within 1km of the Project Site are shown in Figure 14.7 below.

14.4.24 There are 10 GP surgeries within 1km of the Project Site, with an average list size of 1,802 patients per GP (NHS Choices, 2015).40 The Healthy Urban Development Unit (HUDU) suggests benchmark provision of 1,800 patients per GP. This indicates there is currently no surplus GP capacity available locally.

14.4.25 In addition, there are 8 dentists, 10 Pharmacies and 4 opticians within the 1km study area.

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40 Data unavailable for Ingleton Road Surgery, therefore this GP has been excluded from the analysis of existing capacity.
Public Open Space

14.4.26 LB Haringey policy identifies a need to use physical regeneration opportunities to create more and better open space and public realm. This is considered to be particularly important for parts of the borough with an identified deficiency of open space (including Northumberland Park).

14.4.27 Strategic Policy 13 (Open Space and Biodiversity) of LB Haringey’s Local Plan (2013) outlines a requirement to enhance areas of identified open space deficiency and deliver open space infrastructure programmes as set out in the Infrastructure Delivery Plan (2012). Haringey’s Open Space and Recreational Standards Supplementary Planning Document (2008) and Open Spaces Strategy (2006-2016) supports the Local Plan Strategic Policies (2014), and identifies areas deficient in public open space and play areas.

14.4.28 Much of Northumberland Park is shown as falling ‘outside of 400m pedestrian catchment’ from public open spaces in LB Haringey’s evidence base. The nearest spaces are the Lee Valley to the east (although separated by the train line), Hartington Park to the south, and Bruce Castle Park to the west. However, Northumberland Park ward does perform well in terms of access to pitches in secured public use via Frederick Knight Sports Ground and Northumberland Park Sports Centre directly to the east of the THFC stadium.
14.4.29 Within 1km of the Project Site, there are eight public open spaces, including one ‘Local Park’ (Bruce Castle Park). It should also be noted that Tottenham Marshes District Park and Lee Valley Regional Park are located to the east of the Project Site, and Tottenham Cemetery is located within 1km to the west of the Project Site.

14.4.30 The open spaces within 1km of the Project Site are mapped in Figure 14.8 below.
Figure 14.8: Public Open Space, Playspace and Sports Facilities within 1km of the Project Site  
(Source: LBH Open Space Strategy; Greenspace Information for Greater London; Sport England)

Sports Facilities

14.4.31 Including the Tottenham Hotspurs Foundation, there are ten sports facilities within 1km of the Project Site. This includes four gyms/sports centres, three sports pitches and two community centres. These facilities are shown in Figure 14.8 above.

Tottenham Hotspur Foundation

14.4.32 Tottenham Hotspur Foundation, a not-for-profit body established in 2006, provides community benefits beyond the functions of the football stadium including programmes focussing on benefitting the community in terms of employment, education and health outcomes. Research suggests these programmes generated savings for central government totalling £7.8million in the 12 months to October 2014 – based on the Foundation having delivered 95,000 hours of work relating to community benefits. In addition it is estimated that the foundation, through its programmes and partnerships, leveraged approximately £7 million in additional investment to the tri-borough area over the last 7 years. Programmes relating to community benefits include:

- Employment and skills – research by Deloitte states the Foundation’s job brokerage scheme has enabled hundreds of local people to find jobs, including by working with residents to develop skills to secure employment. This includes 216 jobs at Sainsbury’s and 123 jobs at Centreplate taken by local residents. Jobs fairs are also regularly held at the stadium in order to connect local residents with employers – in the
first six months of 2015 four jobs fairs have been coordinated by the Foundation;

- Community development – a community development team delivers over 6,500 hours of free activities involving 1,500 young people every week – including facilitating sports activities, and mentoring and skills programmes;
- Health and wellbeing – the Foundation delivers programmes encouraging cycling, delivering health checks, and supporting with people with long-term and mental health issues;
- Education – the Foundation provides student mentoring programmes as well as degree-level education on-site in partnership with Middlesex university (as of June 2015, 100 students were studying a degree using the club’s facilities), and also runs skills building programmes with young people with disabilities and long-term health problems;
- Inclusion – the Foundation runs a number of programmes targeting members of the community at risk of exclusion, including older people older people and people facing long-term health problems and mental illness; and
- Sports Development – a number of programmes delivered by the Foundation seek to provide pathways into sport and physical activity – including through coaching and maintaining clubs in badminton, judo, table-tennis and volleyball.

14.5 Potential Environmental Impacts and Effects

14.5.1 This assessment of operational impacts of the Project is set against policy objectives and baseline conditions summarised above.

Construction

14.5.2 Using standard ratios of construction employment to output, applied to estimated construction costs for the Project, it is possible to forecast the number of construction jobs that would be generated by the Project.

14.5.3 The construction impact of the Project is based on construction cost estimates for the various different elements of the scheme. A labour coefficient, or ratio between expenditure and FTE jobs supported is applied to the overall construction spend to estimate the person years generated. Based on the data outlined in the methodology section, construction employment is therefore assessed as approximately 3,560 person-years of employment. The Construction Industry Training Board (CITB) estimate that up to half of this employment may be situated off site in design, management, engineering, logistics and architectural roles.

14.5.4 By convention 10 person-years of employment is equated to one permanent full-time equivalent job. On this basis the construction phase of the Project would generate around 356 full time equivalent (FTE) jobs. Over a four-year construction period this is equivalent to 890 FTEs. Works are currently underway in demolition and site preparation for the northern part of the Project, which will include a small proportion of these FTE jobs in civils contracting roles.

14.5.5 A programme of construction training will be agreed via a Section 106 Agreement with the Council to ensure that local people have access to employment arising from the Project.

14.5.6 The net effect of the Project during the construction phase against the baseline is considered to provide a

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41 CITB Labour Forecasting Tool, 2015
**Occupation**

**Gross Employment**

**Football and Commercial Elements**

14.5.7 The operation of a new, increased capacity football stadium will require extra on-site employment, particularly in part-time matchday roles, including stewarding and catering, hospitality, catering, ticket sales and other support staff. The most recent information from Tottenham Hotspur FC’s Annual Report notes that there are currently 125 administration staff, and 67 retail and distribution staff at the stadium. In addition, around 570 staff are employed on matchdays in temporary, part-time positions.

14.5.8 Arsenal’s move from Highbury to the Emirates Stadium is the best source of recent, London-based information for the requirement for additional employment resulting from stadium size increase. This suggests that there would be an expected increase of around 100 FTE jobs in a range of positions within the Stadium itself including the management of matchday and non-matchday events, and around 330 additional matchday staff employed in temporary, part-time positions due to the increased capacity and higher levels of catering and hospitality provided.

14.5.9 There would be further opportunities for employment related to non-football related activity seven days per week, some of which is accounted for in the increase in employment at the Club described above, but also in temporary and part-time employment in catering and hospitality for events and conferences.

14.5.10 There will also be a number of jobs created by the other commercial, leisure and retail elements of the Project, including the hotel, extreme sports centre and Tottenham Experience (including rooftop walk) set within a plaza environment.

14.5.11 The proposed 180 room 4* hotel (with 49 serviced apartments) would lead to an additional 185 FTE jobs (gross), based on standard assumptions of jobs per room.

14.5.12 The Tottenham Experience includes a museum and cinema, retail megastore and café along with ticket office and rooftop experience. Based on standard floorspace per job assumptions, this would lead to an additional 125 gross FTE jobs.

14.5.13 The extreme sports centre would be likely to include specialist climbing, diving and other facilities. Based on standard floorspace per job assumptions, this would lead to an additional 25 gross FTE jobs.

14.5.14 An area of flexible space will be provided within the Southern Residential Development, which would be brought forward as office or community space. Based on standard floorspace per job assumptions, this could generate between 55 and 265 FTE jobs.

14.5.15 Overall, the gross employment effect from the Project would amount to the creation of at least an estimated 490 FTE jobs (up to 700 FTE jobs dependent on the flexible space) and around 330 part-time roles on matchdays. If further growth of the Tottenham Foundation were to occur as planned, this figure would be higher. The level to which the stadium is used for non-football uses, including conferences,
events, other sports and concerts would have the potential to significantly increase the overall direct and indirect employment generation of the Project.

14.5.16 The Project would bring forward gross employment considered to be a major beneficial effect at the local scale and a moderate beneficial effect within the Wider Impact Area.

Labour Market Fit

14.5.17 The additional employment generated will primarily be in the service sector – in retail, leisure, hospitality and catering. The occupational breakdown of jobs in these sectors is comparable to both the local skill set of residents, but more crucially the sought occupation of current unemployed people - almost half of the people looking for work in Tottenham are seeking jobs in personal service, sales or customer service sectors (around 1,500 people), with a further 20% looking for process/elementary level work.

14.5.18 This demonstrates a very good fit between the large number of entry-level jobs in the Project and the types of jobs in demand locally. There is also a high proportion of managerial employment in these sectors, and large employers are keen to train and retain staff, offering opportunities for local residents to gain and keep jobs, and progress to other opportunities in the sector while gaining new skills.

14.5.19 The ‘gateway’ role of retail employment has been noted as a major beneficial role of the sector in London’s economy. The sector can provide part time, flexible work for local residents, often those at risk of exclusion from the labour market, but can also reduce under-employment, and allow people to gain key employability skills.

14.5.20 Retail employment in London tends to have a strong local catchment. Currently, around 13% of jobs in Northumberland Park are taken by residents, and around 50% from the Wider Impact Area. GLA data shows that of retail jobs in London, over 40% are taken by residents of the same borough compared to 30% for all jobs.

14.5.21 Overall, the employment generated through the operation of the completed Project is considered to be a major beneficial effect at the local level. The baseline assessment indicates that the local area has high unemployment levels and low skills attainment, and this Project presents the opportunity for the Club and Council to work together with local agencies to improve job prospects for local people in-line with the objectives of Haringey’s planning and regeneration policies.

Local Spending

Household Spending

14.5.22 Increased levels of spending would be expected as a result of the introduction of a new residential population. The average household expenditure in London (excluding non-local expenditure) is around £260 per week\(^{42}\), including food and local services. The additional 585 homes provided within the Southern Development would therefore be expected to generate around £7.9m per year in household spending, dependent on the local comparison and convenience retail offer.

14.5.23 There are currently around 5,600 households in Northumberland Park ward. If the average household expenditure above is applied to the current households in the ward, the Project would increase local

household expenditure by around 10%.

Employee Spending

14.5.24 There is expected to be an associated increase in local spending caused by increased employment. Total net additional FTE employment created by the Project is estimated to be around 407 FTE jobs at the club and commercial development, not including temporary matchday staff, in the Inner Impact Area. Based on an average daily spend of £10.59 per day on food and drink alone, this would result in an increase of around £950,000 per year.

Football Spending

14.5.25 Over the past five seasons, Tottenham Hotspur played on average 28 friendly and competitive home matches per season, with an average attendance at around 98% of the official capacity. Increasing the stadium to 61,100 capacity could increase the number of match-related visits by almost 700,000 per year (approx. 70% increase from the current visitor draw).

14.5.26 There are a number of metrics used by economists and researchers to estimate the amount of time and money spent inside and outside football stadia by supporters on matchdays on food, drink and entertainment. Based on a conservative 60% of supporters spending locally outside the ground, and an estimated range of between £2 to 10 per supporter, the improved stadium could result in an additional £0.8m to £4.2m being spent in the local area each year.

14.5.27 More optimistic estimates of spending, for example that used in Brentford FC’s recent “Community Benefits Statement” appended to their planning application for a new stadium estimate that this figure could be up to £17 per patch day, with around 63% being spent outside the stadium in the local area. If this is achieved, the benefit to the area around THFC could be up to an additional £7.5m each year.

14.5.28 Recent research by Deloitte into a match at the current stadium in April 2015 estimated that fans visiting THFC from elsewhere in London (31% of visitors) spend around £34 per visit in the Wider Impact Area and £5 elsewhere in London, while those from elsewhere in the UK (55% of visitors) spent an average of £20 in the Wider Impact Area and £10 elsewhere in London. Visitors from overseas spend substantially more (£20 in the Wider Impact Area and £94 in London) and make up the remainder of the visitors. If these figures were applied, football activities would generate around £41m in the Wider Impact Area and £34m spending elsewhere in London each year.

Major Events (including NFL) and Concerts

14.5.29 It is anticipated that the stadium would host up to 10 ‘major events’ each year, including at least two NFL games (this could increase over time and has the potential to develop into a permanent franchise base).

14.5.30 This approach has the potential to deliver long-term economic and social benefits to businesses and residents already in Tottenham and LB Haringey, but also goes beyond this in terms of anchoring regeneration strategies and plans for new homes and developments (and transport links e.g. at White Hart Lane) to the south and west of the new stadium.

14.5.31 The critical mass generated by promoting the Stadium as an NFL venue would be seen directly, for example through NFL retail and enhanced tours, but also indirectly through its branding as a ‘destination’ in North London – with increased visitor draw supporting other leisure and retail facilities in and around
14.5.32 Research by Deloitte suggests that a two game series could attract at least an additional 120,000 visitors to the area each year, estimated to generate a direct economic impact of £21.4m in terms of spending across London. The proportion estimated to be retained in the Wider Impact Area is around £2.4m. This is based on an average spend per visitor in London that is consistent with recently available public information from the 2012/13 London Tourism Report (London & Partners, 2014).

14.5.33 This impact assessment is based on the understanding that the NFL International Series would be increased to 4 matches, split between Tottenham Hotspur FC and Wembley. Given the growth in popularity and demand for tickets, once established there is the potential more games per season are played in London and at the new stadium, or a scenario in which a franchise takes up occupancy at the new stadium, resulting in significantly higher economic benefits.

14.5.34 The multi-use surface would be laid under the grass football pitch, which would be removable, so as not to interfere with the Stadium’s primary football function. However, it would create the opportunity for a multitude of other events to take place here, intensifying the (currently fortnightly) use of the arena and bringing with it the economic benefits of increased visitor draw.

14.5.35 The (up to) eight additional major events, based on a similar level of attendance and expenditure as football matches described above, could generate an additional 480,000 annual visitors with an expenditure of up to £12m in the Wider Impact Area and £10m in London. This is regarded as an upper estimate and would depend on the type, timing and characteristics of the events.

14.5.36 In addition to these major events, the stadium will be able to hold up to 6 concerts per year, with a capacity of 55,000, generating a total of up to 330,000 visitors per year. Based on expenditure figures outlined above, this could generate an additional £0.7 to £8m expenditure in the Wider Impact Area on food, drink and recreation, and up to £6.7m in London.

Conferences

14.5.37 Conferencing/banqueting currently has a turnover of £560k in the current facilities at the stadium – planned to increase to £1m in 2015. A Report by The Right Solution Ltd to THFC outlined assumptions that between 73,800 to 81,180 ‘delegate days’ could be achieved by the improved and increased facilities, of which 30% are assumed to require accommodation in the area, leading to an additional 24,540 overnight stays. Due to the nature of these events, spending in the local area on food and drink is likely to be low, although there is a possibility for enhanced tourism through linked trips. Revenue to the club and enhancement of the area’s reputation as a business destination are likely to be the key benefits.

Tottenham Experience and Rooftop Walk

14.5.38 The Tottenham Experience includes a café, retail store and museum, and is expected to generate visits both on matchdays but also as a destination in its own right, catalysed by the active environment created by the rest of the commercial and residential elements in the Southern Development. A feasibility study has indicated that the rooftop walk could draw between 45,500 to 96,600 per year. If spending is anticipated to be in the same range as football visits, with the same proportional split of London-based, UK-based and international visitors, this could generate annual spending in the Wider Impact Area of £91,000 to £2.4m and up to £2m in London.
14.5.39 The current museum and tours at the stadium generate 18,500 visitors per year. It is anticipated that an improved offer, along with linked trips to events, rooftop walk, retail and leisure elements would substantially increase this figure to around 120,000 based on comparator facilities in London. If spending is anticipated to be in the same range as football visits, with the same proportional split of London-based, UK-based and international visitors, this could generate annual spending in the Wider Impact Area of £200,000 to £2.9m and up to £2.4m in London.

14.5.40 Commercial arrangements may mean that an element of the visitors to the Tottenham Experience and Rooftop Walk would visit both facilities, and to some extent the economic impact outlined above would therefore be a maximum estimate.

Hotel

14.5.41 Assuming a conservative approach to hotel occupancy at one person per room and around 81.25% capacity used (London average 2008-2013, PWC, 2014) the 180-room hotel would bring a further 53,000 overnight visitors to the area each year. Assuming that match day visitors would account for around 10,000 of these overnight stays, and non-match day event visitors a further 10,000 this would leave a net additional number of visits of 33,000. Using the expenditure range described above this would provide a net additional £65,000 to £560,000 additional expenditure.

Extreme Sports Centre

14.5.42 Analysis of similar facilities in London, including those with regionally-significant visitor draw as a result of climbing facilities, suggests that the extreme sports centre could attract in the region of 100,000 visitors per year. If spending is anticipated to be in the same range as football visits, this could generate net additional annual spending in the Wider Impact Area of £200,000 to £2.4m and up to £2m in London.

Spending - Combined

14.5.43 The increased spending would generate more employment in the wider area as a result of jobs supported by spending on goods and services. The impact of football and other event-related visitor expenditure is likely to increase substantially, and is considered a major beneficial effect at the local scale, and a moderate beneficial effect in the Wider Impact Area.

Population & Homes

14.5.44 The Project includes the construction of 585 new homes split between 20 studios, 268 1-bedroom flats, 268 2-bedroom flats, 24 3-bedroom flats and 5 3-bedroom townhouses set in four towers of between 16 and 32 storeys to the south of the new stadium. It is currently assumed that all of these homes will be privately rented or sold.

14.5.45 The Project represents a contribution to Haringey’s minimum annual new homes target for 2015/16 to 2024/25 as set out in the London Plan 2015 (consolidated with alterations since 2011) of 1,502 homes, and represents a significant contribution to reaching the targets of the Upper Lee Valley Opportunity Area.

14.5.46 The effect of new homes therefore represents a major beneficial effect at the local and district levels, and a minor beneficial effect at the regional scale. The impact is in-line with policy aspirations at all scales.
Community Facilities – Healthcare & Education

14.5.47 The population of the residential element of the Project is likely to be around 900 people, of which around 40 would be children. This population could create demand for community facilities, including education and healthcare, open space and other community facilities, and is assessed in terms of both these potential effects on capacity and expenditure generated.

14.5.48 The additional primary healthcare needs of the population forecast would equate to demand for around 0.5 GPs to maintain current levels of provision. The Project includes the provision of a community health facility which will host an NHS health centre including a GP surgery, facilities for other health specialists and represent increased access for new and existing residents. As such, the Project will have a minor beneficial effect on access to healthcare in the local area.

14.5.49 The total number of school age children within the residential element of the Project is estimated at around 40, of which around 10 would be of primary school age and 5 would be of secondary school age.

14.5.50 There are currently around 155 surplus places in Primary Schools within 1km of the Project Site, equating to around 3% surplus capacity. The additional primary school age population generated would result in a negligible impact at all scales, as it would be expected that these children could be accommodated in existing capacity.

14.5.51 Children of secondary school age are likely to travel further to school than primary age children and therefore capacity is assessed across Haringey and Enfield. Within schools in the two boroughs, there is currently a surplus capacity of around 3,000 places across all ages, including the recently opened Tottenham UTC. The effect on demand for school places is therefore expected to be negligible at all scales.

Open Space and Public Realm

14.5.52 LB Haringey’s Planning Obligations SPD (2014) highlights that the whole borough is deficient in publicly accessible open space, and in accordance with the Local Plan Strategic Policies, the Council will seek to deliver open space as strategic infrastructure via CIL in the case of Metropolitan Open Land and Strategic Local Open Land. The Infrastructure Delivery Plan states that, in the east of the Borough, opening up access to the Lea Valley Regional Park is a key priority. Other measures such as tree planting and improving access to allotments, and the creation of green routes are also identified as having a role in improving green infrastructure provision.

14.5.53 The Planning Obligations SPD (2014) states that public, communal, amenity and private open spaces will be required in line with standards set out in the Mayor’s Housing Design Guide SPG. However, this SPG does not provide definitive standards in terms of public open space.

14.5.54 Currently, the emerging LB Haringey Preferred Options Draft Development Management DPD (2015) refers back to standards set out in the Open Space & Recreation Standards SPD (2008) for 1.64 ha of public open space per 1,000 people. Applied to the housing mix in this Project, and using the average household occupancy levels in Table 1.5 of the SPD, this would require approximately 1.48 ha of public open space (park) to maintain baseline standards.

residential development should seek to provide a minimum of 5sqm of private outdoor space for 1 and 2 person dwellings and an additional 1sqm should be provided for each additional occupant. This standard has since been carried through to the Draft Interim Housing SPG (2015).

14.5.56 With a total of 585 homes proposed, the majority of which will be flats, the Project could generate a requirement for approximately 3,260sqm of external private open space based on GLA guidance.

14.5.57 All flats will have private amenity space, either as inset or semi inset balconies, wintergardens or private roof or plinth-level terraces. A minimum of 5sqm of private outdoor space is provided for 1-2 person dwellings and an extra 1sqm is provided for each additional occupant, to meet GLA guidelines.

14.5.58 In addition, each tower will have a roof garden, with the combined area comprising 860sqm, and there will be a combined 2,850sqm of community amenity space provided at a residential plinth between Towers A and B.

14.5.59 Public open space will be provided within an area comparable in size to Trafalgar Square to the south of the stadium and includes a multi-use games area, high quality landscaping, cafes, dedicated events and community programmes managed by the Tottenham Hotspur Foundation.

14.5.60 In the context of open space deficiency outlined in the policy and baseline sections above, this provision of space will bring a major beneficial effect at the local scale. In addition to the amenity benefits provided by the investment in new buildings, the retained listed buildings and the public realm will also contribute to maximising the economic benefits described above.

14.5.61 The improved amenity space and public realm is also likely to increase both footfall and dwell time along the High Road supporting existing businesses and creating the potential for vacant buildings to be returned to beneficial uses.

Children’s Play Space

14.5.62 The Mayor’s SPG (Shaping Neighbourhoods, 2012) requires 10sqm per child of play space to be provided as part of the Project. By applying the Mayor’s child yield calculator to the proposed unit mix, it is expected that approximately 41 children (between 0 and 17 years of age) will live within the residential element of the Project. The age profile of those children and the play space requirements of each age group is provided in the following table:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No. of Children</th>
<th>Play space Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 5</td>
<td>25</td>
<td>250 sqm</td>
</tr>
<tr>
<td>5 to 11</td>
<td>9</td>
<td>90 sqm</td>
</tr>
<tr>
<td>12+</td>
<td>7</td>
<td>70 sqm</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>410 sqm</td>
</tr>
</tbody>
</table>

14.5.63 The Mayor’s SPG (Table 4.7) requires that developments which expect to accommodate between 30-49

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43 Child yield model used in the Mayor’s Shaping Neighbourhoods – Play and Informal Recreation SPG (2012)
children should seek to provide on-site play space for all children aged 11 and younger. Provision for older children (12+) may be provided off-site within 800m from the Project Site. There are parks comprising play space for older children within 800m of the Project Site, including Bruce Castle Park.

14.5.64 According to Table 14.8 above, the scheme generates demand for 340sqm of play space for 0 to 11s on-site. The needs of these children will need to be met within the Project Site. The spatial layout of the Project Site should be designed sensitively to avoid shortfalls in play space provision, particularly for younger children, as under 5s are expected to be able to access play space within 100m of their homes.

14.5.65 The Project Site provides a combined 410sqm of playspace within the residential plinth at Tower D and in two areas between Towers B and C, which meets and exceeds the required amount of playspace on-site for residents of the Project Site. In addition to the significant public realm within the plaza to the south of the stadium, the proposed playspace provision will have a minor beneficial effect at the local scale.

**Sport & Recreation**

14.5.66 LB Haringey’s Key Infrastructure Delivery Plan (Appendix 4 to the Local Plan Strategic Policies) identifies the White Hart Lane Community Sports Hub as a sub-regional hub on the advice of the London Playing Fields Association needs analysis. In the wider area, there are aspirations to develop Tottenham High road as a sub-regional sports and leisure hub.

14.5.67 The Infrastructure Delivery Plan refers to LB Haringey’s Open Space and Sports Assessment SPD (2008) for assessments of current deficiency and need.

14.5.68 The Project provides formal sport and leisure provision in the form of an Extreme Sports Centre which would aid in the aspirations of local policies in developing a sub-regional sports and leisure hub at Tottenham High Road. In addition, the plaza to the south of the new stadium will include a multi-use surface on which the Tottenham Hotspur Foundation will run community sports activities.

14.5.69 The likely impact of a net additional 900 residents, against the standards set out in LB Haringey’s Open Space and Sports Assessment SPD (2008) and development that has occurred in Northumberland Park and Tottenham since the assessment, combined with the additional facilities created by the Project, would be of moderate beneficial significance within the Inner Impact Area.

**Crime and Safety**

14.5.70 Propensity for crime is affected as much by underlying social factors as the physical environment, and as such it is not possible to provide a quantified assessment of the impact of a development project on crime (or fear/perception of crime).

14.5.71 The new stadium will see an increase in matchday visits, as well as non-match event visitors. The residential element will increase the overall population, and the public realm, open space, community facility and commercial development will increase visits, expenditure, improve the active street scene and physical environment.

14.5.72 Research into the Home Office dataset on football-related arrests and banning orders identified that for clubs who have increased their capacity by moving to or replacing a stadium have not experienced significant increases in arrests. Evidence from the closest London-based comparator (Emirates Stadium)
highlights that match-day arrests have remained constant since Arsenal’s move from Highbury, and crime rates in the wider area have fallen.

14.5.73 A larger stadium can broaden the range of fans attending, and can allow more room for family or corporate areas. A modern design will allow for improved crowd management, and the Club will continue to work with the Metropolitan Police and other bodies to manage and mitigate the potential for disorder.

14.5.74 The wider Project Site provides a range of uses that will animate the newly created public areas and provide an enhanced level of natural surveillance. The creation of high quality and well-maintained spaces with increased activity would contribute to an improved perception of safety and reduced fear of crime. The public spaces will be well lit and monitored by CCTV, and incorporate the principles of the Metropolitan Police’s “Secured By Design” guide and general measures to design out crime.

14.5.75 Details of the scheme’s design in accordance with modern accessibility, design and safety standards are provided within the Design & Access Statement.

14.5.76 To ensure that crime rates are not unduly affected by increases in capacity at Tottenham Hotspur, the Club is committed to the production and implementation of a Stadium Management Plan which would deal with all public safety, crime, prevention and local transport management issues related to the Project Site whenever the Stadium is in operation for football or non-football events. The Stadium Management Plan includes:

- Event Management Plan led by the Club;
- Operations Plan led by Metropolitan Police;
- Local Area Management Plan led by the Club;
- Stadium Travel Plan led by the Club; and
- Monitoring Programme led by the Club.

14.5.77 Overall, the improvement to the physical environment, improved activity levels, and mitigation by design principles committed to by the Club represent a major beneficial effect at the local level.

Community Activity – Tottenham Hotspur Foundation

14.5.78 The Project will enable the Tottenham Hotspur Foundation to take up new office space in Percy House. The Foundation will continue to operate within the community, and there could be scope to increase its impact and effectiveness given the improved facilities and increased brand presence of the Club. The Foundation will be able to build on its role of brokering employment opportunities, engaging hard-to-reach groups, facilitating educational programmes, and attracting investment.

14.5.79 There would be scope for the Foundation to further increase its contribution to the local area, using the public space to the south of the new stadium as a platform for community building events and managing the space in a way that maximises its use by all members of the community. The Foundation and Club have developed a range of potential activities that could utilise the new stadium and public open space as well as roll out further off-site activities. The public space is a key part of this, with a multi-use surface that would be used to organise sports, leisure, health and well-being activities.
Club Moving off site

14.5.80 The Project necessitates that for at least one season the Club will play its home fixtures away from its current location. At this stage, the Club is holding discussions with regard to possible venues for this season, and as such it is not possible to identify whether there would be net effects on employment and spending at a London-wide scale.

14.5.81 At the local scale, there is likely to be a temporary, short-term adverse effect related to loss of local spending on the average matchdays per season, and associated with other events. However, there would be a level of mitigation in terms of the temporary spending effect of construction workers in the local area.

14.5.82 Given that this is a short-term effect, which is necessitated by the design and which would result in a faster construction period with less disruption than proposed in the consented scheme, and bring forward significant, long-term, permanent economic benefits above and beyond the current Project Site and its uses, no specific mitigation is envisaged.

14.6 Additional Mitigation, Compensation and Enhancement Measures

14.6.1 The likely impacts of the proposals described above are largely positive and support the delivery of local, regional and national Government objectives. The measures proposed by the club are therefore largely focussed on enhancing these effects rather than mitigating impacts.

Construction

14.6.2 The Club will work with Haringey Council and other partners to maximise the significant beneficial impacts of the construction phase of the Project. This will include:

- A Construction Employment Programme, including provision of labour demand information, local advertisement and recruitment and customised training;
- A Local Labour Programme, including targeted activities to ensure local people can access employment at the Club and with its suppliers; and
- Business engagement and supply chain initiatives.

Operation

14.6.3 The Club will work with Haringey Council and other partners to maximise the significant beneficial impacts of the operational phase of the Project. This will include:

- Engagement in local area management, town centre management and area promotion, involving the Club, its suppliers, the hotel and events organisers;
- Enhanced engagement by the Tottenham Hotspur Foundation with local schools, and in sports development activity in the local area;
- The integration of a dedicated training programme for the hospitality industry within the 180-room hotel within the Project Site; and
- Business engagement and supply chain initiatives.
Cumulative Impacts

14.6.4 A number of prospective developments in the Inner Impact Area could have cumulative socio-economic effects with respect to employment, spending, housing provision, population, and demand for social infrastructure such as schools, healthcare and open space. These developments are detailed in Chapter 3.

14.6.5 The assessment of cumulative effects presented below considers the effect of prospective Major Development (development comprising 200 or more residential and/or 10,000 sq m commercial floorspace) within, or very close to, the boundary of the Inner Impact Area. The expected effects of the Project have been included as it is expected these effects would supersede those associated with the consented scheme should the Project come forward.

14.6.6 Only ‘major developments’ have been included in the cumulative impact assessment due to the comparative size of the Project – it is expected that any impact of a smaller development would not materially affect the significance of the effects already assessed as part of the Project on its own. Other major developments will have a similar scale of effects which are therefore more likely to influence the cumulative or combined effects in the area.

14.6.7 In addition, information on policy-committed development proposals without planning applications / permissions (i.e. for High Road West and Northumberland Park Regeneration) has been identified through a review of the High Road West Masterplan (September 2014) and the Northumberland Park Strategic Framework Report (February 2015).

Construction

14.6.8 There is insufficient publically available information to carry out a quantitative assessment of the construction effects of the cumulative developments, due to the sensitive nature of construction cost information. However, due to the mobility of the construction workforce and in the context of the size of the existing construction workforce at a regional level, the overall effect is likely to be negligible to minor beneficial at the regional level, although there is the potential for local benefits to be derived through employment and training programmes.

Operation

14.6.9 The cumulative schemes would bring forward a range of uses including residential, student accommodation, office, retail, leisure, hotel and community floorspace.

14.6.10 Cumulative effects on employment have been assessed by reviewing the planning applications and policy documents relating to the relevant schemes. Where an employment figure was not available, the methodology used within this chapter has been applied to the employment generating floorspace in order to estimate the jobs associated with the planned development. Should all schemes assessed come forward as planned, they would generate up to approximately 1,090 net full-time equivalent jobs. These jobs will offer employment opportunities for local people and will generate significant spending effects. Both employment and associated spending from employees is assessed to be a moderate beneficial impact at the borough level. In addition, policy documents associated with the Northumberland Park Regeneration plans state that new development would include employment generating uses such as workspace and new shops. However, detail regarding the quantum of net employment this would
generate is not yet available and has therefore not been included as part of this assessment (although any further net additional employment created would be expected to have a beneficial effect at the borough level).

14.6.11 In terms of effects on housing provision, overall, the cumulative schemes are expected to bring forward up to an estimated additional 6,360 residential units and 700 units of student accommodation. Including the Project, and excluding the student accommodation, this represents 6,940 homes which represents a significant contribution towards borough housing targets of 1,502 homes per annum. These units comprise approximately 45% of Haringey’s 10 year housing target for the years 2015-2025 (London Plan, 2015). The cumulative effect on housing provision in the borough is therefore assessed to be a major beneficial effect, and a minor beneficial effect in the context of London-wide housing targets.

14.6.12 The residents accommodated by the residential units would create an increase in demand for community facilities including schools, open space, healthcare and leisure facilities. Population assumptions have been made for this assessment of cumulative effects using the average household size for LBH for all types of homes. This provides an estimate that the cumulative schemes would accommodate approximately up to an additional 16,600 residents within, and just beyond the boundary of, the Inner Impact Area. Some demand for community floorspace will be met through the provision planned as part of a number of the cumulative schemes. This includes:

- The provision of a primary school, a crèche and a healthcare centre as part of the Hale Village scheme;
- Provision of space for community/leisure uses as part of the Haringey Heartlands scheme – located just beyond the boundary of the Inner Impact Area;
- Planned provision of a health centre, crèche, sports centre, and learning centre (to include a library, ideas store, enterprise workspaces and a community centre) as part of the High Road West Masterplan; and
- Provision of a new health centre, and new/expanded education facilities including a new all-through school and potentially a new primary school as part of the Northumberland Park Regeneration Area.

14.6.13 These facilities will contribute towards meeting the needs of the new population brought to the area by these and other planned cumulative schemes. It is expected that those effects not mitigated through on-site physical provision will be delivered through S106/CIL monies in line with the infrastructure requirements identified in LB Haringey’s Planning Obligations SPD (2014). Following mitigation where required, the cumulative effect in terms of demand for social infrastructure is expected to be negligible.

14.6.14 Overall these schemes together with the Project, would generate new employment, have a positive impact on the local economy through increased spending, and deliver new housing and new social infrastructure, which together would have a beneficial effect in terms of socio-economics.

14.7 Assessment Summary and Residual Environmental Impacts and Effects

Construction

14.7.1 The employment impacts associated with the construction phase are beneficial and therefore do not require additional mitigation. However, The Club will work with Haringey Council and other partners to enhance the beneficial impacts through programmes identified in the previous section.
Operation

14.7.2 The additional mitigation and enhancement activities referred to above will enhance the beneficial effects described above and ensure a major positive impact at the local level.

14.7.3 The benefits of visitor expenditure will be enhanced through the Transport Strategy, which details aims to stagger the arrival of fans by offering better facilities in and around the stadium. THFC already has a relatively high proportion of fans that arrive in the area early on matchdays, and therefore this is a significant contribution to the positive aspects of visitor expenditure.

14.7.4 The Club will adopt a Stadium Management Plan, which will deal with all the public safety, crime prevention and local transport management issues and mitigate the impacts of increased visitor numbers. The residual impact on these issues will therefore be negligible.

14.7.5 The Project will provide a significant improvement in the public realm at the Project Site and a true public square for community use on the High Road, and has developed a clear vision for the multi-functional public space in front of the stadium, which will act as a focus for events (some organised and run by the TH Foundation) and activities.

14.7.6 The proposed residential element of the Project will yield an estimated population of around 910 people, requiring community facilities including primary healthcare and education. Due to relatively small child numbers in the Project Site the impact of this on schools will be negligible.
### Table 14.9 Socio-Economics Assessment Summary

<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance</th>
<th>Additional Mitigation</th>
<th>Residual Impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment generation</td>
<td>Medium</td>
<td>Beneficial</td>
<td>Low</td>
<td>Minor (local) Negligible (regional)</td>
<td>None required</td>
<td>Low</td>
<td>Minor (local) Negligible (regional)</td>
</tr>
<tr>
<td><strong>Operational Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Direct Employment</td>
<td>Medium</td>
<td>Beneficial</td>
<td>Medium/High</td>
<td>Major (local) Moderate (Wider Impact Area)</td>
<td>None required</td>
<td>Medium/High</td>
<td>Major (local) Moderate (Wider Impact Area)</td>
</tr>
<tr>
<td>Visitors &amp; Spending</td>
<td>Medium</td>
<td>Beneficial</td>
<td>Medium/High</td>
<td>Major (local) Moderate (Wider Impact Area)</td>
<td>None required</td>
<td>Medium/High</td>
<td>Major (local) Moderate (Wider Impact Area)</td>
</tr>
<tr>
<td>Provision of new homes</td>
<td>Medium</td>
<td>Beneficial</td>
<td>Medium/High</td>
<td>Major (local) and Wider Impact Area) Minor (regional)</td>
<td>None required</td>
<td>Medium/High</td>
<td>Major (local) Moderate (Wider Impact Area)</td>
</tr>
<tr>
<td>Healthcare requirements (including delivery of Community Medical Centre)</td>
<td>Medium</td>
<td>Beneficial</td>
<td>Low</td>
<td>Minor (local)</td>
<td>None required</td>
<td>Low</td>
<td>Minor (local)</td>
</tr>
<tr>
<td>Education</td>
<td>Low</td>
<td>Neutral</td>
<td>Low</td>
<td>Negligible</td>
<td>None required</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td>Open Space and Public Realm including provision of plaza and improvements to public realm</td>
<td>Medium</td>
<td>Beneficial</td>
<td>Medium</td>
<td>Major (local)</td>
<td>None required</td>
<td>Medium</td>
<td>Major (local)</td>
</tr>
<tr>
<td>Play space provision</td>
<td>Low</td>
<td>Beneficial</td>
<td>Low</td>
<td>Minor (local)</td>
<td>None required</td>
<td>Low</td>
<td>Minor (local)</td>
</tr>
<tr>
<td>Sport and recreation</td>
<td>Medium</td>
<td>Beneficial</td>
<td>Medium</td>
<td>Moderate (local)</td>
<td>None required</td>
<td>Medium</td>
<td>Moderate (local)</td>
</tr>
<tr>
<td>Crime and Safety</td>
<td>High</td>
<td>Beneficial</td>
<td>Medium</td>
<td>Major (local)</td>
<td>None required</td>
<td>Medium</td>
<td>Major (local)</td>
</tr>
</tbody>
</table>
15. Traffic and Transport

15.1 Introduction

15.1.1 This chapter of the ES has been produced by Tim Spencer & Co and has had input from other members of the project team including, Buro Happold Consulting Engineers and Movement Strategies. It has also drawn from documents produced for the 2010 and 2012 applications including the Transport Assessment, the PERS Audit undertaken by TRL in 2015 and the visitor assessment by Quod.

15.2 Assessment Criteria and Methodology

Previous Assessment

15.2.1 The Project Site is split into three areas:

- The Northern area – located south of Northumberland Park has recently been developed and now comprises a Sainsbury’s superstore, offices, education uses and car parking.
- The Central area – located to the north of Paxton Road is currently under development to provide a 61,000 seater stadium for Tottenham Hotspur Football Club.
- The Southern area – is located to the south of Paxton Road. The new stadium will incorporate Paxton Road and the southern stand is to the south. It is proposed that a hotel, residential uses, the Tottenham Experience and an extreme sports facility are provided on this site.

15.2.2 A planning application covering all three areas was submitted in 2010 and a Transport Assessment prepared to accompany the submission. Since the original submission, the proposals for the northern area have been implemented and occupied. In addition, revised development proposals for the central and southern areas have come forward and a revised planning application for them has been submitted. Two updated Transport Assessment documents have been prepared as follows:

- Non-Major Event Day Transport Assessment and Travel Planning 2015; and;
- Major Event Day Transport Assessment and Travel Planning 2015.

Scoping Opinion

15.2.3 There has been a series of pre-application meetings held with TfL and LB Haringey, to discuss the key transport issues arising from the Project. A substantial amount of information has been submitted before and after the meetings, with on-going dialogue between all the parties. The Major Event Day TA was discussed in May to July 2014 and the Non-Major Event Day was discussed in August 2015.

Legislative Context

15.2.4 There is no legislation relevant to this topic. The key guidance is given in planning policy.
Planning Policy and Guidance

15.2.5 The London Plan, the Mayor’s Transport Strategy and various documents produced by the London Borough of Haringey have been used to provide a framework which has informed the development of the proposals and the Transport Assessments.

15.2.6 The key policies which are of relevance to this chapter are the local transport improvements either, completed, underway or committed and the car parking standards.

15.3 Baseline Conditions

Baseline Data Collection

15.3.1 The existing transport conditions are similar but not exactly the same as those comprehensively surveyed in 2003, 2007, 2008 and 2009. In particular highway traffic flows were resurveyed in 2015 and give an updated baseline.

Highway Network

15.3.2 The highway network is dominated by the A1010 High Road which runs in a north south direction and links to the A406 North Circular in the north and the A10 in the south.

15.3.3 The updated traffic information gathered in 2015 shows that there has been a significant decrease in traffic flows in the local area since the previous surveys carried out in 2009. This finding is in line with the 2011 census data which reveals that at the DfT count point along the High Road there has been a drop of 18% in flows between 2001 and 2011. The results should also be seen in the context of the removal of uses, and therefore trips, from the central site and that the northern development has been completed and occupied.

15.3.4 There have been comprehensive changes made to the Controlled Parking Zones (CPZs) across Tottenham. These changes were brought into effect in early 2014 and now cover match days and non-match days.

15.3.5 An analysis of accident data shows that the accident rate along the High Road for a three year period 2012 to 2014 indicates that the accident rate is well below the national average for an A road and below the average for Haringey. Although the yearly average is for 19 accidents (18 slight and 1 serious) there have been no fatalities in three years. Therefore, there is no accident issue associated with the Project proposals.

Public Transport

15.3.6 The local area is very well served by public transport. An indicator of this are the PTAL ratings for various locations of between 3 and 5, which is ‘average’ and above.

15.3.7 The rail stations (national rail and Overground) at White Hart Lane, Bruce Grove, Seven Sisters, Northumberland Park and Tottenham Hale can all be accessed from the Project Site. Seven Sisters and Tottenham Hale Stations are also served by the Victoria Underground Line. National Rail and Overground services have high train frequencies of between 2 and 10 trains per hour in the periods. The Victoria Line is currently running a reduced service as engineering works take place to facilitate the new 36 trains per hour timetable. The rail and underground surveys indicate that there is spare capacity available on all
15.3.8 The Project Site is well served by a range of bus services, all running high frequency services.

**Pedestrians**

15.3.9 The ‘Pedestrian Environment Review System’ Audit, a method developed by TRL to assess the quality of the pedestrian environment, was updated in 2015. Although, the updated PERS Audit undertaken notes that the local environment for pedestrians has improved since 2010, the report still makes recommendations for some quick wins which will improve the local area. In particular gum, litter and graffiti removal, de-cluttering and works to dropped curbs and tactile paving are suggested.

**Census Data**

15.3.10 Data from the Office of National Statistics has been used to give an indication of direction of commuting trips from London Borough of Haringey in 2011. Two thirds of people travelled to six destinations, Westminster/City of London (22.7%), Haringey (15.9%), Camden (12.6%), Islington (9.7%) and Enfield (5.2%). The data also reveals that public transport use for the journey to work has increased by 14%.

**Existing Stadium**

15.3.11 The existing stadium currently provides little in the way of event day facilities (such as bars or restaurants) or entertainment to attract or retain spectators before or after the event. The result is that people arrive close to the start of the event and leave soon after the end.

15.3.12 The results of the 2003 surveys highlighted a perception amongst spectators of the stadium being inaccessible by public transport, with the result that in 2003 survey up to 62% of spectators were travelling to matches by car. Following the 2003 survey, an event day Controlled Parking Zone (CPZ) was introduced, there were match-day increases in local train frequencies and a programme of transport information provision was introduced through the THFC website. By 2008 the results showed that these measures had resulted in increased use of public transport and a reduction in car travel (reduced to between 38% and 43% for the final leg of the journey).

15.3.13 Separate mode splits were measured for weekday and weekend matches. Table 15.1 below shows the Weekday mode splits.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Arrival Mode</th>
<th></th>
<th>Departure Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>People</td>
<td>%</td>
<td>People</td>
</tr>
<tr>
<td>Underground</td>
<td>4,321</td>
<td>12.0%</td>
<td>6,043</td>
</tr>
<tr>
<td>Rail</td>
<td>12,626</td>
<td>35.1%</td>
<td>10,916</td>
</tr>
<tr>
<td>Bus</td>
<td>4,179</td>
<td>11.6%</td>
<td>2,451</td>
</tr>
<tr>
<td>Car</td>
<td>13,054</td>
<td>36.3%</td>
<td>14,901</td>
</tr>
<tr>
<td>Cycle</td>
<td>59</td>
<td>0.2%</td>
<td>58</td>
</tr>
<tr>
<td>Coach</td>
<td>366</td>
<td>1.0%</td>
<td>277</td>
</tr>
</tbody>
</table>
15.3.14 For weekends, the mode splits are shown in Table 15.2.

### Table 15.2 Weekend mode splits

<table>
<thead>
<tr>
<th>Mode</th>
<th>Arrival Mode</th>
<th></th>
<th>Departure Mode</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>People</td>
<td>%</td>
<td>People</td>
<td>%</td>
</tr>
<tr>
<td>Underground</td>
<td>4,700</td>
<td>13.0%</td>
<td>6,632</td>
<td>18.4%</td>
</tr>
<tr>
<td>Rail</td>
<td>11,213</td>
<td>31.1%</td>
<td>10,613</td>
<td>29.5%</td>
</tr>
<tr>
<td>Bus</td>
<td>3,735</td>
<td>10.4%</td>
<td>2035</td>
<td>5.7%</td>
</tr>
<tr>
<td>Car</td>
<td>14,969</td>
<td>41.6%</td>
<td>15,558</td>
<td>43.2%</td>
</tr>
<tr>
<td>Cycle</td>
<td>96</td>
<td>0.3%</td>
<td>96</td>
<td>0.3%</td>
</tr>
<tr>
<td>Coach</td>
<td>72</td>
<td>0.2%</td>
<td>24</td>
<td>0.1%</td>
</tr>
<tr>
<td>Taxi</td>
<td>292</td>
<td>0.8%</td>
<td>218</td>
<td>0.6%</td>
</tr>
<tr>
<td>Walked all the way</td>
<td>707</td>
<td>2.0%</td>
<td>536</td>
<td>1.5%</td>
</tr>
<tr>
<td>Motorcycle + Others</td>
<td>217</td>
<td>0.6%</td>
<td>287</td>
<td>0.8%</td>
</tr>
<tr>
<td>Total</td>
<td>36,000</td>
<td>100.0%</td>
<td>36,000</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

15.3.15 Around 85% of spectators arrive at the stadium in the 45 minutes before the start of the match, with up to 40% of spectators arriving in the final 15 minutes. There is a little variation depending on the day of the week, with the Sunday match survey showing slightly earlier arrivals. Departures show a similar pattern, with around 85% leaving within the 45 minutes after the final whistle, and relatively small numbers leaving before or after that time.

15.3.16 The current situation sees coach passengers dropped off on High Road opposite Cedar Road before the event with the coaches then driven to West Road, where they are parked during the event. After the event, coaches travel back to Worcester Avenue to pick up spectators. The existing arrangements are able to cope with the demand.

### Assessment Methodology

15.3.17 A major event is defined as an event at the stadium with more than 10,000 spectators. A non-major event day is when there are less than 10,000 spectators. For Major Event Days at the stadium the following scenarios have been assessed:

- Football matches – c.25-30 matches per season, with a seating capacity of 61,000 people;
NFL Matches/Other sporting events – at least two and up to ten per year, with up to 61,000 people; and
Concerts – up to six concerts per year with up to 56,000 spectators.

15.3.18 The football scenarios are the most onerous in transport terms due to the of numbers of spectators, although this is mitigated by the fact that football fans are generally more familiar with and will make more efficient use of the transport network than the other scenarios.

15.3.19 Capacity forecasts are developed for all three forms of public transport: National Rail and London Overground, London Buses, and London Underground. In all three cases, these are based on match-day service levels and non-spectator background demand. For National Rail and London Underground, the overall capacities also depend on station capacity forecasts.

15.3.20 For the Non-Major Event Day an assessment of the trips generated by the residential development, the Tottenham Experience, the health centre and non event day attractions etc has been made together with an assessment of construction traffic.

15.3.21 All of the assessments have used existing local sites as comparators, and best practice guidance and the methods discussed with TfL and LB Haringey.

15.3.22 The methodology and assumptions for the demand and capacity forecasts for the Project are described in detail in the Major Event Day Transport Assessment and Travel Planning 2015 document.

Geographical Scope

15.3.23 The geographical scope of the assessment in the area generally bounded by the local stations, White Hart Lane, Bruce Grove, Northumberland Park, Seven Sisters and Tottenham Hale. The A406 North Circular Road forms the northern boundary.

15.3.24 The geographical scope of the pedestrian network being modelled is determined by the set of public transport nodes primarily used by spectators on match days. This is informed by studies undertaken from 2008 to 2014 to identify travel conditions associated with the current stadium.

15.3.25 The geographical scope of the forecasts is shown in Figure 15.1 below.
15.3.26 Separate modules have been generated to assess the demand at the interiors of the rail stations at White Hart Lane, Northumberland Park, Tottenham Hale and Seven Sisters. Although the various modules are not linked, the assumptions used and demand volumes and patterns are consistently applied across each.

15.3.27 Whilst some pedestrian journeys start or end outside this scope, for the purpose of demand forecasts journeys are assumed to start or finish at points on the extremity of this area.

15.3.28 The initial model covered event-day scenarios, with matches taking place on a Saturday afternoon or midweek evening. A survey was undertaken in 2008 to highlight differences between Saturday, Sunday and Midweek matches. Additional surveys in 2014 confirmed that the 2008 patterns remain valid. The forecasts cover the pre-match and post-match periods, from three hours before kick-off to three hours after the final whistle.
Significance

15.3.29 The 2007 Department for Communities and Local Government (DCLG) and Department for Transport (DTT) publication Guidance on Transport Assessment (now withdrawn) refers to Circular 02/99: Environmental Impact Assessment (Circular 02/99) published by the former Department of the Environment, Transport and the Regions (DETR) (also withdrawn), provides details on environmental assessment in general. However, Circular 02/99 does not provide specific guidance on the approach to traffic and transport related assessment.

15.3.30 Therefore, this assessment has been undertaken in accordance with the guidance provided in the 1993 Institute of Environmental Assessment (IEA) publication Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic, hereafter known as the IEMA guidelines.

15.3.31 This guidance is the only document available which sets out a methodology for assessing potentially significant traffic-related environmental impacts where a proposed development is likely to give rise to changes in traffic flows.

15.3.32 The following rules, summarised from the IEMA guidelines, have been used as a screening process to define the scale and extent of this assessment.

- Rule 1: Include roads where traffic flows are predicted to increase by more than 30% (or where the numbers of HGVs are predicted to increase by more than 30%).
- Rule 2: Include any specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

15.3.33 The IEMA guidelines elaborate on Rule 1 stating that projected changes in traffic of less than 10% create no discernable environmental impact, given that daily variations in background traffic flow may fluctuate by this amount, and that a 30% change in traffic flow represents a reasonable threshold for including a highway link within the assessment.

15.3.34 The IEMA guidelines also identify groups, locations and areas which may be sensitive to changes in traffic conditions and which should be considered for assessment. Groups, locations and areas could, for example, include pedestrians, cyclists, shopping areas, schools and accident hotspots. Where traffic flows are predicted to increase by 10% or more, those relevant sensitive groups, locations and areas will be assessed. It should also be noted that the IEMA guidelines also state that other affected parties could be added if the assessor considers it appropriate.

15.3.35 The significance of each impact is considered against the criteria within the IEMA guidelines, where possible. However, the IEMA guidelines state that:

“for many effects there are no simple rules or formulae which define the thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources.” (paragraph 4.5)

15.3.36 In this assessment, significance falls into two categories; not significant and significant. The latter
corresponds to significant impacts in accordance with the EIA Regulations. In the absence of established significance criteria for traffic and transport impacts, professional judgement has been used to assess whether the impacts on traffic and transport are considered to be significant.

Assumptions and Limitations

15.3.37 Pedestrian surveys were undertaken to understand the numbers of spectators, as well as the direction of flow, that could be expected at different parts of the local pedestrian network. The spectator analysis suggests that event day visitors to the site are willing to walk greater distances than are usually considered in public transport accessibility analysis.

15.3.38 Station and train surveys indicated that mid-week event day services had the highest level of passenger demand, particularly for trains that coincided with the commuter peak. In the post-event surveys there were some short periods where levels of increased crowding occurred, as would be expected. The results suggest that the mid-week event day scenario provides a worst case. Station and carriage surveys were also carried out at Underground stations, for which the busiest times correlated closely with the train surveys.

15.3.39 Surveys of bus stop boarding and alighting activity highlighted that there was higher background demand on bus services in general on a weekday evening, accounting for commuter journeys. On this basis, the weekday scenario provides a worst case for future analysis. Analysis of Bus Origin Destination Survey (BODS) data has shown that area wide there is considerable capacity on the existing bus network.

15.3.40 High Road is currently closed for up to 45 minutes in the post-match period. The closures are put in place by the MPS in order to maintain separation between home and away fans. The proposed stadium allows better separation and is expected to reduce the time for which High Road will need to be closed to traffic.

15.3.41 For demand forecasting, it is assumed that spectators travelling by rail will use White Hart Lane, Northumberland Park, Seven Sisters or Tottenham Hale stations. Bruce Grove is served by the same trains as White Hart Lane, is further from the stadium and is unlikely to be heavily used.

15.3.42 It should be noted that White Hart Lane station is on the same route as Seven Sisters. It is assumed that any spectators using these services will board and alight at White Hart Lane due to its proximity to the ground. Similarly, Northumberland Park is on the same line as Tottenham Hale, but substantially closer to the Stadium. Therefore, any attendees walking to or from Seven Sisters and Tottenham Hale are assumed to use the Victoria Line.

15.3.43 Upon arrival, all spectators are assumed to walk from the station along White Hart Lane towards the High Road, and then circulate via the ‘shortest’ route to the four Stadium entrance gates. For other rail stations, the shortest distance is the default assumption.

15.3.44 During the immediate post-event period, it is assumed that attendees walking to White Hart Lane station will take different routes depending upon their direction of travel. This is in accordance with the assumption that different station entrances will be used for each platform. Northbound travellers are assumed to approach from the High Road via White Hart Lane and southbound travellers are assumed to approach via Whitehall Street and Love Lane.
15.4 Inherent Design Mitigation

15.4.1 There has been considerable progress with the implementation of the THFC transport strategy between 2010 and 2015. There has been significant investment over recent years, particularly to the Victoria Line, thereby improving the service for fans and the local community. New faster and higher capacity trains have already been delivered and a new 36 trains per hour frequency will be introduced in the near future (April 2016).

15.4.2 Many of the improvements currently being implemented were in the very earliest stages of development in 2010 when the previous planning application was submitted. For example:

- The first part of the Seven Sisters station interchange improvements have been completed with further work to improve the quality of the station interchange for all passengers.
- The London Overground devolution will improve services and rolling stock at White Hart Lane and other stations.
- A planning application for proposals to improve White Hart Lane Station is expected in late 2015. The station will be linked to the stadium by a more direct route, Moselle Square, which is being promoted by Haringey Council.
- The upgrade to Tottenham Hale Station was in the earliest stage of development in 2010, construction will start in the near future.
- Northumberland Park station will be reconstructed as part of the 3 tracking scheme, facilitating significant service improvements for the route to Stratford. This should be finished well before the development is finished.
- The removal of the Tottenham Hale Gyratory was a TfL Business Plan commitment in 2010. In 2015 it is substantially complete. The final stage has involved the construction of a major bus station at Tottenham Hale interchange.
- The construction of the new Cycle Superhighway CS1 that connects the stadium to Liverpool Street started in July 2015. A large cycle park has been built in the northern development next to Lilywhite House.

PERS Audit

15.4.3 Although, the updated PERS Audit undertaken notes that the local environment for pedestrians has improved since 2010, the report still makes recommendations for some quick. In particular gum, litter and graffiti removal, de-cluttering and works to dropped curbs and tactile paving are suggested.

Local Highway Improvements

15.4.4 As part of the Project some improvements are proposed to the High Road, Park Lane and Worcester Avenue. The improvements and swept path analyses are illustrated in the Buro Happold drawings submitted with the Transport Assessment. There are no proposed changes to Northumberland Park, or the High Road junctions with Northumberland Park or White Hart Lane. The recent improvements are considered to be working well.

Car Parking Provision
15.4.5 The policy guidance indicates that in appropriate locations, car-free residential development should be promoted. In general, the approach to car parking in the Project is to under-provide compared to standards, which are in place to set maximum figures. So, whilst the Project is not car free, the provision of car parking is significantly less than the standard. For example, the standard applicable to the residential units is up to 1 space per unit, however, the ratio proposed is 0.46 per unit.

15.4.6 Similarly, if the LBH maximum standard of 0.66 spaces per room was applied to the hotel, there should be 120 spaces provided rather than the 53 allocated.

15.4.7 Wheelchair accessible Blue Badge parking is set at 10% or more of the supply. For the residential units this would give a minimum standard of 24.3 spaces (10% of 243). The actual number proposed is 27 spaces which equates to 0.046 blue badge spaces per unit. Within the general population, 4.6% is well in excess of wheelchair users that are car owners.

15.4.8 In the 2010 assessment, the stadium had 319 parking spaces and access to a total of 727 on the stadium site. The revised stadium proposals have increased capacity for 785 parking spaces. However, this increase is more than offset by the London Borough of Haringey's High Road West Masterplan, which has already led to 870 off-street parking spaces being removed from the surrounding area, leading to a net decrease in parking availability in the local area. Furthermore, the stadium features a removable grass pitch which, when removed, is inserted into a ‘pitch pocket’ in the car park, reducing the number of spaces by 217 to just 518.

15.4.9 Blue Badge parking in the stadium is increasing under the proposal from 58 (under the 2010 submission) to 150 in the current proposal, of which 90 will be wheelchair accessible.

**Travel Plans**

15.4.10 A series of Travel Plans was prepared for the previous application. These living documents will be updated and new ones added for different aspects of the Project. The revised, proposed s106 Agreement sets out commitments to develop the Travel Plans, appoint a Travel Plan Co-ordinator for the whole development and to establish a Travel Plan Management Group. Arrangements for monitoring the plans will be discussed with the London Borough of Haringey.

**Match Day Arrangements**

15.4.11 The new stadium will be actively promoted as a ‘Public Transport Destination’, as has been achieved at Wembley Stadium, with service improvements, new shuttle bus links, better pedestrian connections, real-time travel information points, clear signage and regular transport updates on the THFC website, in printed programmes, and directly to fans from several sources.

15.4.12 The Spurs Travel Plan was introduced in 2008 and was very highly rated when independently assessed by the Campaign for Better Transport. It forms the basis for the future when all the transport and station improvements come online in advance of the stadium completion.

15.4.13 There has already been a significant shift in travel patterns to the stadium area. In 2003, over 60% of fans came by car. For weekend fixtures that figure had reduced to 42% by 2014 and the intention is to bring that number down to a maximum of 23% in future. In future all supporters will be actively encouraged to arrive earlier and stay later in the stadium area to take full advantage of the new facilities in and around the redeveloped stadium and to enjoy a new post-match events programme, reducing the pressure on...
transport services.

15.4.14 The Club will operate two new shuttle bus services on major event days. The first service will run from Alexandra Palace station by way of Wood Green. The model for this service is the Allianz Park service which carries more than 3,000 Saracens supporters before and after games. A second service will provide a high frequency link between the upgraded Tottenham Hale interchange and the stadium area for premium ticket holders to relieve the pressure on the scheduled bus services to and from the Victoria Line at Seven Sisters station.

15.4.15 Road closures have previously been in place for at least 30 minutes following the post-match closure of the High Road, requiring buses to be diverted in the post-match period. Highway works on junctions, planned by LB Haringey in 2010 in order to reduce the duration of closures, have now been completed, and TfL Buses have previously undertaken to reduce the bus diversion time. The result is that diversions are expected to end, in future (in 2018), around 15 minutes after the road closure is lifted. There will also be increased use of the W3 and the new high frequency shuttle bus services that connect the stadium to the Piccadilly Line, as an alternative to using Seven Sisters.

15.4.16 The reconfiguration of seating for away supporters will make it easier to manage interactions between home and away supporters, reducing the need to divert public transport services, and the Club will continue to fine-tune its operation to improve the service for supporters and minimise disruption to local residents.

15.4.17 Coach parking requirements are highly variable and are heavily dependent on the requirements of away team supporters. Using conservative assumptions the total coach demand is forecasted to be less than 30 per game in 2018. Parking to meet this demand will be accommodated in the industrial area. Access to this site accessed via Leeside Road, Watermead Way and the A406. None of these roads are residential.

15.4.18 On the rare occasion that overflow capacity is required, this can be accommodated on Pretoria Road. Similar arrangements are in place at other large stadiums with overflow capacity only required a few times over the course of a decade.

15.4.19 The multiple stadium access points and the extensive public realm being planned will make it easy for spectators to reach their preferred arrival and departure routes and provide easier access to alternative venues in the local area pre- and post-match.

15.4.20 Pedestrian flows will quickly be dispersed into the wider street network; unlike at stadiums such as Wembley, where major pedestrian flows dominate the local area. This will be supported by carefully targeted investment in the local area to assist the organised dispersal of pedestrian movements after a game; including CCTV at strategically important locations, the removal of unnecessary obstructions in footways, comprehensive signage providing real time travel information, and effective stewarding. Further information on the pedestrian environment in the locality of the stadium is provided by the Environmental and Safety Audit (which has been submitted as part of the planning application).

15.4.21 Historically, the number of people choosing to walk or cycle has been relatively low compared with many other football stadiums. Around 5% of spectators live within 5km of the stadium. This suggests scope for a higher share of journeys to be made by cycle or on foot. This proportion could grow further with
prioritisation to local residents in the season ticket allocation system, as has happened at the Emirates, where 6.5% (or over 3,500) spectators now walk. Under the Section 106 agreement, approximately 5,000 local residents who register their interest with the club will be offered season tickets with a preferential choice of seating, after existing season ticket holders’ seats have been allocated.

15.4.22 As part of the stadium move THFC is proposing to:

- Actively promote and prioritise tickets to local residents;
- Agree a full range of away supporter seating area strategies to deal with the full range of possibilities;
- Ensure that all normal (non-evacuation) access for away supporters is via Worcester Avenue;
- Update and modify the car parking restrictions in Worcester Avenue on event days;
- Actively promote and encourage away fans to travel by coach, including implementation and management of segregated coach parking when necessary; and
- Make improvements to footways and signage, providing enhanced facilities for pedestrians between the station and stadium area. To be agreed with TfL and LBH.

Cycling

15.4.23 As well as the start of construction on the Cycle Superhighway CS1, which will connect the stadium to Liverpool Street in the south, a large cycle park has been built in the northern development next to Lilywhite House. Approximately 5% of spectators live within five kilometres of the site. Along with improved facilities and promotion of their availability, this provides scope for increased cycling mode share.

15.4.24 The Club will actively promote cycling by providing spectators with information on cycle routes and on the availability of secure cycle parking. The aim is to provide them in locations that can be easily accessed from each of the major approach routes and in locations that can also suit the needs of other buildings in the local area such as stations, community buildings, recreational areas, and the new retail and office developments.

15.4.25 THFC aims to:

- Actively promote cycle access to the local area on event days;
- Provide a non event day primary cycle parking facility; and,
- Support the provision of dispersed cycle parking at a variety of locations within the local area that would also fulfil a non event day demand for cycle parking.

15.4.26 A range of transport mitigation measures will be formalised through the Section 106 agreement. These include:

- Implementation of the Stadium Travel Plan;
- Achieving a designated modal split target of 77% spectators using non-car modes;
- Implementation of an Event Day Monitoring Programme;
- Extension of the event-day Controlled Parking Zone;
- Two shuttle bus services;
The Home Supporter Travel Initiative – a programme of communication with Home supporters to encourage non-car modes;
- Retention of Visitor Measures – a programme of pre- and post-match entertainment;
- Improved signage;
- A Cycle Superhighway terminus;
- Additional traffic suspension on Worcester Avenue; and
- Provision of electric charging points at a proportion of car parking spaces.

15.5 Potential Environmental Impacts and Effects

Construction

15.5.1 The only additional significant transport issue related to the construction of the new basement to that of the previous assessment is the removal of a proportion of the excavated material (spoil) to off-site locations. The increased volume of new building construction is far less significant given that it would probably equate to less than a 10% net increase in the overall stadium building construction activity for example, in terms of the volume of concrete needed to build the Project.

15.5.2 It was proposed that the basement excavation would occur in 3 stages – all of which were of a lesser scale, in traffic terms, to the already completed spoil removal from the Northern Development area.

15.5.3 Surveys have revealed that the new food store private vehicle trip generation is actually very similar to that related to the old store which was located just to the north of the NDP area. Levels are actually two-thirds less than those predicted and accepted by TfL/LBH. The effect of the construction work has happened after the new supermarket opening is therefore unlikely to be a significant issue.

Central and Southern Areas

15.5.4 The next phase of the work would also relate to the area north of Paxton Road which would entail deeper excavations. The timescale for the activity is predicted to be 3 months (69 working days). This will average at 4 HGV trips per day into and out of the construction site.

15.5.5 The final phase of the site preparation works would relate to the area south of Paxton Road. The timescale for the activity is also predicted to be 3 months (69 working days). This will average at 11 HGV trips per day into and out of the construction site. The 2 stages of work will actually yield more re-usable material than could be beneficially used on the site. Of the 58,500 cubic metres that would be recovered some 20,000 cubic metres (34%) would be sold for off-site use. Over the two 69 day periods that would result in a further 16 HGV trips a day to and from the work site.

15.5.6 On the basis of an ‘effective cap’ of 75 arrival and departure trips, as per the worst case assessment in the May 2010 ES, this level of activity would be well within the threshold deemed to be acceptable.

15.5.7 If the piling and foundation works are closely integrated in sequence with the excavation works that might add another 9 HGV trips per day into and out of the site, i.e. 36 (9+11+16) in total during the second stage, which would still result in a level of HGV trip generation of much less than the ‘effective cap’ assessed to peak at 75 two-way HGV trips per day.
New Stadium Proposals – Construction Traffic

15.5.8 The new stadium construction is now forecast in 2015 to generate 27,330 1-way trips – an increase of 33%. This increase is based on a like-for-like comparison with the 2010 application. This increase is significantly related to the volume of concrete required to build the stadium basement and the pitch pocket. The stadium will be constructed in 31 months from January 2016 to July 2018.

15.5.9 The peak trip generation for the stadium construction will occur in May and June 2017 – at 75 1-way trips a day – i.e. a peak of 37 vehicles arrivals and departures each day – which is similarly related to the, re-assessed, demolition of the existing stadium. This level of construction traffic is well below the ‘effective cap’, in terms of the highest monthly forecast of NDP construction traffic, which was established and accepted in 2010, and is also less than the peak daily stadium-related construction traffic forecast in 2010, at 84 1-way trips (as forecast to occur in December 2013).

15.5.10 All these vehicles would be directed to travel to and from the site by way of the A1010 to the Fore Street junction with the North Circular Road. The environmental impacts would be no worse than as forecast in 2010.

15.5.11 It is proposed that a construction compound off White Hart Lane to the east of the railway tracks is used. Although this would not significantly reduce the peak daily forecast of trips, there are three main benefits to using the site:

- It would be possible to use larger vehicles to shuttle between the works site and the stadium site
- The total vehicle mileage would be significantly reduced, 1 km trips rather than 20 km trips.
- The site would provide a local storage area away from the construction site for all the material to be re-used in construction.

15.5.12 With the construction compound in place the new stadium construction is forecast to generate 21,307 1-way trips an increase of 3% compared to the 2010 information. This increase mainly relates to the additional works required for the stadium basement and pitch pocket.

15.5.13 The biggest benefits of the construction compound would be apparent in 2016 when there would be a 95% reduction to the volume of construction traffic within the A1010 north of the construction site i.e. a reduction from 42 daily 1-way movements to 2 daily 1-way trips. In 2017 the benefit of the construction compound to the A1010 corridor would be much less, with a forecast reduction from 47 daily 1-way trips to 32 daily 1-way trips.

Southern Area

15.5.14 The construction of the proposed Southern Development will be a bigger undertaking than that assessed in 2010. The number of residential units is more than 3 times greater, the hotel is slightly larger and there is the addition of the Extreme Sports building plus a slightly larger Tottenham Experience building.

15.5.15 It is assumed overall that the construction activity will be 3 times greater than as assessed in 2010 but over a much longer timeframe commencing in 2018 and completing in December 2021.
15.5.16 The peak monthly construction traffic would occur in the second half of 2019 and October/November 2020. On each occasion the peak activity would equate to 13 1-way trips per day, i.e. 6-7 daily arrivals and departures. This level of construction traffic trip generation for the Southern Development is well below the ‘effective cap’ of 150 1-way trips as established as an acceptable level of trip generation in 2010.

15.5.17 It has been possible to ‘validate’ the 2010 assessment of the Northern Development (which is now operational) spoil removal phase – the previously defined worst case situation. This shows that the traffic impact was lower than expected and there is no evidence of problems caused by the longer than expected duration of the HGV activity.

Occupation

Stadium – Football Matches

15.5.18 The worst case spectator arrival and departure profiles are forecast to be as follows:

| Table 15.3 Assumed Spectator Arrival Profiles at the Stadium Gatelines (Midweek Evening) |
|---------------------------------------------|----------------------------------|
| Minutes before kick-off | Proportion of Spectators Arriving - Midweek Evening |
| 0-15 | 30.0% |
| 15-30 | 25.0% |
| 30-45 | 15.0% |
| 45-60 | 10.0% |
| 60-75 | 10.0% |
| 75-90 | 10.0% |

| Table 15.4 Assumed Spectator Departure Profiles form the Stadium Gatelines (Midweek Evening) |
|---------------------------------------------|----------------------------------|
| Minutes after final whistle | Proportions of Spectators Departing - Midweek evening |
| 0-15 | 75% |
| 15-30 | 10% |
| 30-45 | 10% |
| 45-60 | 5% |
| 60-75 | 0% |
| 75-90 | 0% |

15.5.19 Based on surveys undertaken in March 2008, the pre-match lengths of stay shown in Table 15.5 have been assumed, applied to Home and Away fans regardless of the final mode of transport.
Table 15.5 Assumed Times spent by Spectators at pre-match destinations (Midweek Evening)

<table>
<thead>
<tr>
<th>Minutes spent at pre-match destinations</th>
<th>Proportion of Spectators spending time in the Local Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15</td>
<td>3.50%</td>
</tr>
<tr>
<td>15-30</td>
<td>15.40%</td>
</tr>
<tr>
<td>30-45</td>
<td>19.50%</td>
</tr>
<tr>
<td>45-60</td>
<td>15.90%</td>
</tr>
<tr>
<td>60-75</td>
<td>10.50%</td>
</tr>
<tr>
<td>75-90</td>
<td>11.00%</td>
</tr>
<tr>
<td>90 - 105</td>
<td>8.30%</td>
</tr>
<tr>
<td>105 - 120</td>
<td>6.70%</td>
</tr>
<tr>
<td>120 - 135</td>
<td>9.20%</td>
</tr>
</tbody>
</table>

15.5.20 Post-match lengths of stay were not recorded in the March 2008 survey. However, for those who do stay, the main rationale is to allow crowds to dissipate before attempting to travel. For forecasting the base case, spectators who stay in the local area are nominally assumed to spend ninety minutes at the post-match destination, taking them outside the period of peak demand at the transport nodes. 30% of Home fans and 5% of Away fans are assumed to spend time in the local area after the match.

15.5.21 Surveys undertaken in 2008 indicate that the most popular pre- and post-match destinations are pubs, cafés or restaurants in the local area.

Mode Splits

15.5.22 Extensive measures have been undertaken to ensure a substantial mode shift away from cars and towards walking, cycling and public transport. The resulting mode split of Home and Away fans on arrival is as shown in Table 15.6 (assuming non-London opposition for the Away fan mode splits). The mode splits recorded in the March 2008 spectator surveys are shown for comparison.

Table 15.6 Assumed Home Spectator Final Mode Split on Arrival

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coach</td>
<td>1.5%</td>
<td>0.4%</td>
<td>16.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Local Bus</td>
<td>10.5%</td>
<td>11.7%</td>
<td>13.0%</td>
<td>9.7%</td>
</tr>
<tr>
<td>of whom interchange at SS</td>
<td>5.5%</td>
<td>11.7%</td>
<td>10.0%</td>
<td></td>
</tr>
<tr>
<td>Taxi</td>
<td>1.7%</td>
<td>0.9%</td>
<td>0.0%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Walk</td>
<td>3.0%</td>
<td>0%</td>
<td>0%</td>
<td>5.1%</td>
</tr>
<tr>
<td>Cycle</td>
<td>1.0%</td>
<td>0.2%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Rail to WHL</td>
<td>21.0%</td>
<td>17.9%</td>
<td>26.5%</td>
<td>26.9%</td>
</tr>
<tr>
<td>Rail to NP</td>
<td>15.8%</td>
<td>14.0%</td>
<td>8.5%</td>
<td>7.2%</td>
</tr>
<tr>
<td>Tube to SS, then Walk</td>
<td>11.3%</td>
<td>11.3%</td>
<td>22.5%</td>
<td>29.4%</td>
</tr>
<tr>
<td>Tube to TH, then Walk</td>
<td>5.2%</td>
<td>1.8%</td>
<td>2.5%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>
15.5.23 Forecast mode splits for Home and Away fans on departure are shown in Table 15.7, with recorded mode splits from May 2014 spectator surveys for comparison.

Table 15.7 Assumed Home Spectator Final Mode Split on Departure, with actual mode splits recorded in May 2014

<table>
<thead>
<tr>
<th>Mode</th>
<th>Assumed Home Fan Modal Split - Departures</th>
<th>Home Fan Mode Split v. Chelsea (19th March 08)</th>
<th>Assumed Away Fan Modal Split – Departures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>19.5%</td>
<td>39.6%</td>
<td>11.0%</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>0.0%</td>
<td>0.2%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Shuttle Bus</td>
<td>9.5%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

15.5.24 Table 15.7 Assumed Home Spectator Final Mode Split on Departure, with actual mode splits recorded in May 2014

15.5.25 Table 15.8 sets out the assumed direction of travel for spectators arriving at the National Rail stations.
Table 15.8 Assumed Proportions of Spectator Arrivals by Rail from each Direction

<table>
<thead>
<tr>
<th>Station</th>
<th>Split of Demand - Midweek Evening</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>From Central London (incl. those interchanging at TH and SVS)</td>
<td>From the North</td>
<td></td>
</tr>
<tr>
<td>White Hart Lane NR</td>
<td>63% (of whom 31% interchange from Victoria Line at Seven Sisters)</td>
<td>37%</td>
<td></td>
</tr>
<tr>
<td>Northumberland Park NR</td>
<td>53% (of whom 17% interchange from Victoria Line at Tottenham Hale)</td>
<td>47%</td>
<td></td>
</tr>
</tbody>
</table>

15.5.26 For departing passengers, Table 15.9 shows the assumed direction of travel post-match, based on the findings of surveys and observations made during matches in March 2008, for both Home and Away fans.

Table 15.9 Assumed Proportions of Spectator Departures by Rail from each Direction

<table>
<thead>
<tr>
<th>Station</th>
<th>Split of Demand – Midweek Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To Central London (inc. those interchanging at TH and SS)</td>
</tr>
<tr>
<td>White Hart Lane NR</td>
<td>60% (of whom 35% interchange to Victoria Line at SS)</td>
</tr>
<tr>
<td>Northumberland Park NR</td>
<td>50% (of whom 21% interchange to Victoria Line at TH)</td>
</tr>
</tbody>
</table>

15.5.27 Surveys of matches at the existing stadium have found that around 27% to 32% of Home spectators travel to matches by rail, via White Hart Lane or Northumberland Park stations.

15.5.28 The new stadium proposals entail significant efforts to encourage mode shift away from cars and towards rail and other modes of public transport. The measures involve restricting car parking availability through the expanded Controlled Parking Zone, improved information about public transport, and improvements to Major Event Day services on the rail network. These measures are described in the Stadium Travel Plan, and in the associated Section 106 obligations.

15.5.29 The measures are expected to increase rail mode share to around 34% to 37% at future events.

15.5.30 This proportional increase, combined with the absolute increase in stadium capacity, brings a large overall increase in the number of passengers using the rail network. These additional passengers are accommodated through service improvements, station upgrades and better balancing between the available services and stations.

National Rail

15.5.31 White Hart Lane is expected to accommodate around 21% of all spectators in the pre-match period,
around 37% of whom arrive from the north, with the remainder from the south.

15.5.32 The principal capacity constraints on both platforms are the 3m staircases to street level. Whereas the southbound platform has 15-minute headways and can easily clear the platform between trains, the northbound platform have occasional shorter headways of just 5 to 8 minutes pre-match. The platform clearance time is 6.5 minutes for the busiest train, meaning the clearance time can exceed the train headway for the busiest trains. However, the station is currently undergoing a redesign, expected to increase its platform capacity above the 166 people/min/m that would be required to clear the platform within the headway time for the busiest train.

15.5.33 In the post-event period, queueing is anticipated outside the station for access to both platforms. For weekday events:

- Queuing outside the station for northbound services will last for 21 minutes with a maximum wait of 22 minutes from arrival at the back of the queue to boarding a train;
- Queuing for southbound services will last 32 minutes with a maximum individual wait of 29 minutes.
- For weekend matches, results are slightly different due to different background demand and train headways:
  - Queuing outside the station for northbound services will last for 12 minutes with a maximum wait of to board a train of 32 minutes;
  - Queuing outside the station for southbound services will last for 56 minutes with a maximum 29-minute individual wait time.

15.5.34 Queues outside the station will be managed and stewarded throughout their duration.

15.5.35 The maximum queues are comparable with those forecast under the previous 2010 submission, and certainly within the range measured at other stadiums, such as Emirates. On this basis, these are deemed to be within acceptable limits.

*Northumberland Park*

15.5.36 The capacity of Northumberland Park Station has been assessed based on assumptions detailed fully in Appendix D, with detailed analysis found in Appendix I. The assessment assumes the existing station layout and current matchday timetable, with all trains operating with eight cars and that the Stratford-Stansted service uplifted to four trains per hour. Background demand patterns were provided by Abellio.

15.5.37 In the midweek post-match scenario, queues are forecast to form outside the station for access to the northbound platform. The maximum queue length is 463 people. The duration of queueing is 23 minutes with the maximum wait for any individual being 19 minutes from arrival to boarding.

15.5.38 Queuing for the southbound platform is expected to last for 27 minutes, with a maximum queue length of 576 people and a maximum wait time for any individual of 16 minutes.

15.5.39 In the weekend pre-event scenario, queuing for the northbound platform will last for 33 minutes, with a maximum length of 1,057 people and a maximum individual wait of 22 minutes. Queuing for the southbound platform will last for 35 minutes, with a maximum queue length of 1,099 people and a
maximum individual wait time of 26 minutes.

15.5.40 As with White Hart Line, the queue lengths and durations are well within the bounds found to be acceptable during monitoring at Emirates, and on that basis are deemed to be acceptable.

**London Underground**

15.5.41 Two Underground stations, Seven Sisters and Tottenham Hale, provide access to the Victoria Line, both also providing an interchange with National Rail and London Underground services. In the existing situation around 16% to 17% of spectators walk to the London Underground services, mainly to Seven Sisters.

15.5.42 The new stadium proposals entail significant efforts to encourage mode shift away from cars and towards London Underground and other modes of public transport. These measures involve restricting car parking availability through the expanded Controlled Parking Zone, improved information about public transport service, and improvements to Major Event Day services on the Victoria Line.

15.5.43 The measures are expected to increase the walk to London Underground mode share from its current level to around 17% to 21% at future events.

15.5.44 This increased mode share, combined with the increase in stadium capacity, brings a significant increase in the absolute number of passengers using the Victoria Line. However, the peak demand is reduced through attraction and retention measures, and the impact is further mitigated by better balancing demand between stations and services, and can be accommodated more easily with the expected improvements in services, station upgrades and better queue management and stewarding.

**Seven Sisters**

15.5.45 Seven Sisters provides an interchange between London Underground and National Rail services. The SPSG special events guidance proposes conservative flow rates that, based on observations and surveys at Seven Sisters Station, are regularly exceeded in reality.

15.5.46 Observation of spectator throughput at the home match against Portsmouth on 23rd March, 2008 found flow rates of 162 people per minute entering the station, with 90% of these travelling on the southbound line. Both London Underground staff and British Transport Police suggested at the time that observations were typical for matchdays and, in agreement with TfL, these higher flow rates and capacities have been used for analysis.

**Table 15.10 Seven Sisters Results**

<table>
<thead>
<tr>
<th></th>
<th>Constraints at LU/ NR interchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday pre-match</td>
<td>Queues managed outside station from 22:25 to 22:55</td>
</tr>
<tr>
<td>Weekday post-match</td>
<td>Queues managed outside station from 22:25 to 22:55</td>
</tr>
<tr>
<td>Weekend pre-match</td>
<td>No capacity constraints</td>
</tr>
<tr>
<td>Weekend post-match</td>
<td>Queues managed outside station from 17:30 to 17:39</td>
</tr>
</tbody>
</table>
15.5.47 During the weekday pre-match period, vertical circulation elements provide sufficient capacity to accommodate all flows without causing delays. Interchanges between London Underground and National Rail services will be busy. Peak platform loading will reach up to 1,000 people and some passengers may have to wait for a train to pass before boarding.

15.5.48 To prevent congestion inside the station during the midweek post-match period, access to Seven Sisters via the High Road entrance will be regulated on Major Event Days. Entry to the station of 165 people per minute can be maintained using six ATGs and one Wide Access Gate (WAG), and queues are expected to form outside the station from 22:25 for approximately 30 minutes, with a maximum length of 62 people and a maximum individual waiting time of less than one minute.

15.5.49 Spectators interchanging from the National Rail southbound line onto the Victoria Line services use different parts of the station and so no queueing is anticipated on stairs from the National Rail platform. Queuing is expected on the escalator descending to the Victoria Line, expected to reach around 250 people at its maximum, but would clear before the arrival of the next train. Delays for an individual are anticipated to be less than three minutes.

15.5.50 No queuing is expected in the National Rail to London Underground southbound interchange. The London Underground southbound platform demand is expected to be within its capacity.

15.5.51 During the weekend pre-match period, all station vertical circulation elements will provide sufficient capacity for background and spectator flows. Weekend background demand is lower than during weekdays and the demand on the northbound platform, with peak loading of fewer than 300 passengers, will be well within its capacity.

15.5.52 As with the weekday scenario, flows into the station during the post-match period will be restricted at the High Road entrance to 165 people per minute. Queues will form outside the station from 17:30 for approximately nine minutes, with a maximum queue of 109 people and a maximum individual waiting time of less than one minute.

15.5.53 Passengers interchanging from the National Rail platform will be able to clear the platform within two minutes of trains arriving. Queues of around 50 people will form at the head of the escalator linking to the Victoria Line. The maximum delay per individual would be less than two minutes and queues will clear before arrival of the following train. No queuing is anticipated at the base of the escalator. The southbound platform is expected to operate safely without management intervention.

15.5.54 During the weekday pre-match period, the most significant constraint is the vertical circulation from the London Underground platforms. Recent observations indicate that queues of up to one minute form at the escalators at the busiest times. Queues will be mitigated through increased frequency of the Victoria Line Service, which by 2016 is planned to reach 36 trains per hour in both directions during the midweek match period. Space at the base of the stairs can accommodate 40 people queuing. This analysis suggests that some queuing can be expected for up to 45 minutes (with use of stairs) or 2 hours (without use of stairs) prior to a midweek event.

15.5.55 Weekday post-match access to the station is via four automated ticket gates, with sufficient capacity to
15.5.56 Post-match connections from the Northumberland Park service transferring to the Victoria Line is via five automated ticket gates. These have sufficient capacity to enable alighting passengers to clear the gates within three minutes, with only short-lived queuing at the gates. Sufficient space for short term queuing is available within the reconfigured concourse. No capacity issues are anticipated for the Northumberland Park service.

15.5.57 The current entrance to the ticket office provides sufficient capacity to accommodate all flows entering the station. Modification of this entrance, adding a series of individual doors, will add flexibility for staff to manage queues outside the station.

15.5.58 Access to the London Underground is via six automated ticket gates and one wide aisle gate. Some queuing is anticipated at the gates for 29 minutes, with a maximum size of approximately 900 people and a maximum delay for any individual of six minutes. Most passengers will experience no delay or a delay of less than one minute. Both London Underground platforms will operate below capacity, with all passengers boarding the first train after they arrive at the platform.

15.5.59 The weekend scenario is accommodated more comfortably than the midweek scenario due to the lower background demand and lower numbers of spectators using this route. The peak weekend pre-match arrival occurs between 13:15 and 13:30. The station has sufficient capacity for all spectators and background traffic during this period, with no queuing at the base of stairs or escalators.

15.5.60 No delays are anticipated at the National Rail gateline in the post-match period at weekends. All those alighting are able to clear the line within two minutes of train arrival. Passengers boarding the National Rail service at Northumberland Park will be able to board the next train after arrival with no capacity issues on the platform. Trains are anticipated to leave Northumberland Park at capacity. The number of people alighting at Tottenham Hale (to interchange to London Underground) exceeds those wishing to board, allowing sufficient capacity on the trains to carry all passengers wishing to board.

15.5.61 The ticket office provides sufficient capacity to accommodate all flows entering the station during this period. Entry to the Victoria Line is controlled by six automated ticket gates and a wide aisle gate. Their capacity is matched to the vertical circulation capacity, preventing queues at the head of escalators and stairs. Some queuing at the ticket gates is anticipated for 24 minutes. Maximum queue size is expected to be 566 people with a maximum individual wait to be less than four minutes. The majority of passengers will not experience any delay. Platforms in both directions will operate below capacity. Passengers are expected to be able to board the first train after arrival at the platform.

15.5.62 Two shuttle bus services will operate on Major Event Days: one from Tottenham Hale Station and one from Alexandra Palace Station.

15.5.63 In most cases, limited delays are experienced on the shuttle buses, with the longest delays occurring during pickups from the stadium post-match. No individual is expected to have to wait more than ten minutes to use the service. However, the ability to deliver these services with minimal queuing will be driven by the operator, who has not yet been contracted. Operational requirements will be specified at that time.
Bus

15.5.64 Road closures on High Road, leading to bus diversions, mean that bus stops immediately outside the stadium are not currently available for spectators for at least 30 minutes after the road closure is lifted. Discussions with TfL Buses in 2008 led to the creation of a new plan to reduce the time for which bus diversions are in place. With a reduced diversion time, it will be possible for passengers to wait at the most convenient bus stop for their journey until the service recommences, rather than move to stops further from the stadium. Services are in future expected to resume normal routes within 15 minutes of High Road being reopened.

15.5.65 During the midday pre-match period, a shortfall in capacity may occur on the four routes travelling along High Road between 18:30 and 19:00 (149, 259, 279 and 349). However, the forecasts are based on the conservative assumption that just 85% of the plated capacity will be used. Observations of current behaviour suggest that the full plated capacity of buses will in fact be used during this period. If use of the full plated capacity is assumed, the shortfall is eliminated.

15.5.66 In the post-match scenario, there may be a shortfall in capacity on the same four routes between 22:30 and 23:45. However, as with the pre-match period, this capacity shortfall will be significantly reduced if full plated capacity is utilised. As most trips are to Seven Sisters Station, which is only a short walk from the stadium, a number of spectators are likely to walk to the station instead, further reducing this impact.

15.5.67 In the weekend pre-match period, a shortfall is anticipated between 12:45 and 14:45 on routes 149, 259, 279 and 349. However, as in the midweek, this shortfall is significantly reduced when capacity is fully utilised. As the shortfall occurs more than one hour before kick-off, there is plenty of time to walk the short distance to the stadium and a number of spectators are expected to choose this option. A small post-match capacity shortfall may also occur between 18:30 and 18:45. However, the queue does not exceed 100 people, with a maximum individual wait of less than 10 minutes.

15.5.68 No capacity issues have been identified on other services.

15.5.69 Car mode share has in the past been as high as 60% for Home spectators. A major focus of the transport strategy for the stadium is to try to reduce the number of spectators driving to matches. This will be achieved through a variety of measures to encourage sustainable modes, improve public transport capacity and service levels and discourage driving. The primary tool used to discourage driving is the expansion of the Event Day Controlled Parking Zone, which decreases the availability of parking spaces close to the stadium.

15.5.70 In future, the number of people driving to events is forecast to drop to around 23%. The club is committed to achieving car mode split targets through obligations in a Section 106 agreement with the possibility to expand the CPZ further if it proves to be necessary to achieving this objective.

Stadium – NFL Matches

15.5.71 THFC has successfully developed a strong national support base. Both regular THFC attendees and NFL season ticket holders have very similar home location distributions. However, significantly more NFL spectators will travel longer distances to attend the games. Consequently, staging of NFL games at the proposed stadium will not create any challenges not already being addressed by the Club in implementation of its proposed stadium transport strategy.
15.5.72 The main difference between the football and NFL forecast is that the NFL games will take place on a Sunday, with assumed start and finish times of 14:30 and 18:00, respectively.

15.5.73 The arrival profiles, shown in Table 15.11 below, reflect the time at which spectators enter through gatelines, not the time at which spectators take their seat. These assumed arrival profiles have been derived from observations of NFL games at Wembley Stadium in 2014. The arrival profiles of football and NFL forecasts are very similar.
Table 15.11 Assumed Spectator Arrival Profiles at the Stadium Gatelines (Sunday Afternoon)

<table>
<thead>
<tr>
<th>Minutes Before Kick-Off</th>
<th>Proportion of Spectators Arriving – Sunday Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15</td>
<td>15.0%</td>
</tr>
<tr>
<td>15-30</td>
<td>35.0%</td>
</tr>
<tr>
<td>30-45</td>
<td>20.0%</td>
</tr>
<tr>
<td>45-60</td>
<td>10.0%</td>
</tr>
<tr>
<td>60-75</td>
<td>10.0%</td>
</tr>
<tr>
<td>75-90</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

15.5.75 The assumed departure profiles, shown in Table 15.12, reflect the times at which spectators pass out of the stadium building and onto the public highway. This profile has been generated on the basis of retention measures that will be in place to encourage spectators to remain in the stadium during the post-match period. In comparison to the football forecast, in which there is a 75% departure peak 0-15 minutes after the final whistle, there is a much lower departure peak of 40% 15-30 minutes after the final whistle for the NFL forecast, indicating a more dispersed profile post-match.

Table 15.12 Assumed Spectator Departure Profiles from the Stadium Turnstiles

<table>
<thead>
<tr>
<th>Minutes after Final Whistle</th>
<th>Proportion of Spectators Leaving – Sunday Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15</td>
<td>5.0%</td>
</tr>
<tr>
<td>15-30</td>
<td>40.0%</td>
</tr>
<tr>
<td>30-45</td>
<td>15.0%</td>
</tr>
<tr>
<td>45-60</td>
<td>10.0%</td>
</tr>
<tr>
<td>60-75</td>
<td>10.0%</td>
</tr>
<tr>
<td>75-90</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

15.5.76 With respect to the time that NFL spectators spend in the local area pre- and post-match, assumptions are based on those obtained for the football forecast. Approximately 40% of spectators attending the NFL match are assumed to arrive early to spend time in the local area, and 20% are assumed to spend time in the local area after the match before travelling home.

15.5.77 In total 50% of the pre-Event and post-Event activity is expected to occur at tailor-made NFL fan parks in the local area. The Fan Parks have been factored into the travel demand and pedestrian flow forecasts. The Fan Parks will require subsequent approvals from LBH.

15.5.78 In line with the football scenario, extensive measures will be implemented to ensure a mode shift away
from cars and towards walking, cycling and public transport. In total 15% of spectators are expected to arrive by car, with the majority arriving by rail and tube services. Similar to the football Home fans, 1% will cycle and walk.

15.5.79 Additional assumptions have been generated in relation to the direction of travel of NFL spectators arriving by rail. Table 15.13 and Table 15.14 set out the assumed division of demand upon arrival and departure at each station, respectively. When compared to the football scenario, the percentage of NFL spectators arriving to and departing from Central London to White Hart Lane and Northumberland Park is higher. This reflects a difference in NFL supporter travel, which is less localised and more widespread across the country. As detailed in the sections below however, measures can be put in place to reduce the impact of these constraints accordingly, to ensure minimal disruption to travel.

**Table 15.13 Assumed Proportions of Spectator Arrivals by Rail from Each Direction**

<table>
<thead>
<tr>
<th>Station</th>
<th>Split of Demand ARRIVALS – Sunday Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>From Central London (incl. those interchanging at TH and SVS)</td>
</tr>
<tr>
<td></td>
<td>From The North</td>
</tr>
<tr>
<td>White Hart Lane NR</td>
<td>78.3% (of whom 35% interchange from Victoria Line at Seven Sisters)</td>
</tr>
<tr>
<td>Northumberland Park NR</td>
<td>72.7% (of whom 36% interchange from Victoria Line at Tottenham Hale)</td>
</tr>
</tbody>
</table>

**Table 15.14 Assumed Proportions of Spectator Departures by Rail from Each Direction**

<table>
<thead>
<tr>
<th>Station</th>
<th>Split of Demand DEPARTURES – Sunday Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To Central London (incl. those interchanging at TH and SVS)</td>
</tr>
<tr>
<td></td>
<td>To The North</td>
</tr>
<tr>
<td>White Hart Lane NR</td>
<td>20.8% (of whom 37% interchange to Victoria Line at Seven Sisters)</td>
</tr>
<tr>
<td>Northumberland Park NR</td>
<td>25.0% (of whom 41% interchange to Victoria Line at Tottenham Hale)</td>
</tr>
</tbody>
</table>

**National Rail**

15.5.80 Based on previous surveys and the assumptions made from these for the NFL games, approximately 36% of spectators travel by rail via White Hart Lane or Northumberland Park.

**White Hart Lane**

15.5.81 White Hart Lane is expected to accommodate around 22% of all NFL spectators in the pre-match period, around 5% of whom arrive from the north, with the remainder from the south.

15.5.82 Given that northbound trains arriving at Seven Sisters will be partially loaded with background travellers
and spectators travelling to White Hart Lane from Central London, there will be capacity constraints between 12:15 PM and 13:30 PM. As there is a finite train capacity, a potential issue for consideration is the occupancy of the northbound National Rail platform during this period.

15.5.83 As stated previously, TfL standard advice is to assume trains will not exceed 85% of their plated capacity. However, higher loadings are regularly observed on this route. When trains are assumed to be fully loaded on this route, as is currently the case, peak loading of the platform is between 700 and 800 passengers. Although some passengers on this platform may have to wait for one service to pass before being able to board, the queues will not be excessive.

15.5.84 During the post-match period, about 19% of spectators will depart White Hart Lane Station between 5:45 PM and 8:00 PM, around 5% of whom will depart to the north, with the remainder to the south.

15.5.85 Queues of up to 809 passengers are anticipated to form outside the station for access to the southbound platform. The platform loading will be capped at 859 people, matching the train capacity, assuming that new Class 378 rolling stock is still in use. It is anticipated that the replacement of this rolling stock will be completed in 2019. Controlled flows into the station will therefore take place in order to ensure platform capacity is not exceeded.

15.5.86 No queues are expected on the northbound platform, as demand does not exceed capacity.

Northumberland Park

15.5.87 Northumberland Park station is expected to accommodate about 11% of all NFL spectators in the pre-match period, around 3% of whom will arrive from the North, with the remainder from the south. There are no significant conflicts anticipated between spectator demand and available rail capacity either northbound or southbound at Northumberland Park.

15.5.88 During the post-match period, about 17% of spectators are forecast to depart Northumberland Park station between 5:45 PM and 8:00 PM with 33% to the north and the remainder to the south. The queuing anticipated for northbound services from Northumberland Park station is minimal, with a maximum queue length of 65 people, maximum queue duration of 1 minute and maximum delay of 16 minutes between arriving and boarding the train. Some queues are anticipated to form outside the station for access to the southbound platform. The maximum queue length will be 577 people with a queue duration of 29 minutes and delay of 14 minutes.
London Underground

Seven Sisters

15.5.89 The Seven Sisters interchange will accommodate about 30% of NFL spectators, who will arrive on the Victoria Line between 10:30 AM and 2:15 PM. Of these, 50% will exit the station and walk to the stadium, 27% will interchange to National Rail trains to White Hart Lane and 23% will interchange onto local buses to the stadium.

15.5.90 During the pre-match period, all station vertical circulation elements will provide sufficient capacity to accommodate the background and spectator flows without delay. This would also be the case should passengers choose not to use the stairs where there is an option between escalators and stairs.

15.5.91 National Rail services arriving at Seven Sisters will already be partially loaded with background travellers and spectators travelling to White Hart Lane from Central London. As is the case for other stations, TfL standard advice is to assume trains will not exceed 85% of their plated capacity, which would lead to queues. However, higher loadings are regularly observed on this route, and in discussion with TfL, a full train capacity of 1,020 has been assumed. This leads to platform loadings of up to 570 people, which can be accommodated at a reasonable density. In this scenario, for all but two periods (12:30 and 13:30), all passengers will be able to board the first train after they arrive on the platform. It is also important to highlight that the transfer to London Overground has resulted in greater levels of station staffing on major event days at this station.

15.5.92 During the post-match period, about 24% of NFL spectators will depart from Seven Sisters on the southbound Victoria Line. Of these passengers, 58% will arrive on foot from the stadium, 29% will interchange from National Rail train services from White Hart Lane and 13% will interchange from buses from the stadium.

15.5.93 To ensure that queuing and congestion do not take place inside the station, access to the station from High Road will be regulated. Queues will form outside the station and will be controlled with queue management and stewarding outside the station. All street level entry is assumed to be via the northernmost access point.

15.5.94 In this scenario, entry into the station would be regulated throughout at 165 people/minute (equivalent of 6 automated ticket gates and 1 wide aisle gate). However, given the rate of arrival at the station, some queues would form from 18:15 PM. The maximum queue length would be 154 people with the requirement to accommodate some level of queuing outside the station for approximately 15 minutes. The maximum delay for any individual would be less than one minute. Demand is held outside the station to prevent queue formation inside, meaning that, upon entry through the ticket gates, passengers are able to walk directly to their platform unimpeded.

15.5.95 During the post-match period, spectators interchanging from National Rail to shuttle bus services (having boarded at White Hart Lane, WHL) onto the Victoria Line services use different parts of the station to those arriving on foot or by bus, so no queuing is expected.

15.5.96 After passing from the platform through the Network Rail elements of the station, interchanging passengers will descend an escalator to the Victoria Line. Small, shuffling queues of around 100 people
are expected at the top of the escalator. Delays incurred will be less than 1 minute at the head of the escalator.

15.5.97 When interchanging from National Rail to London Underground southbound services, at the base of the escalator, passengers descend further stairs to reach the platform, with no queuing is expected. The southbound Victoria Line platform will be fed by two entry points at either end. The platform has capacity for approximately 1,000 people and as indicated in this assessment, the peak anticipated occupancy would be 400 passengers. This suggests that conditions on the platform during the post-match are operate safely without management intervention, any delay in service of more than two minutes at peak times may require access to be controlled.

15.5.98 The available capacity on trains takes into account background users and spectators boarding at Tottenham Hale. For all but three time slots (18:15, 18:30 and 19:19 PM), it will be possible for all passengers arriving on the platform to board the next train.

Tottenham Hale

15.5.99 Tottenham Hale interchange is expected to accommodate about 18% of NFL spectators during the pre-match period between 10:30 AM and 2:15 PM. Of these, 56% will exit the station and walk to the stadium, 22% will interchange onto a THFC shuttle bus, and 22% will interchange onto National Rail services to Northumberland Park.

15.5.100 With respect to vertical circulation from the Victoria Line, the demand exceeds escalator capacity on several occasions, creating small, shuffling queues of up to 40 people that remain within the reservoir area capacity at the bottom of the escalator. The peak period for this would be between 1:00 PM and 2:15 PM. Queuing would be avoided if the stair capacity were fully used in addition to the escalator, although observations suggest that this is not the natural behaviour given the steepness of the stairs. This would therefore need to be managed with encouragement of stair usage.

15.5.101 During the post-match period, about 23% of NFL spectators will arrive at Tottenham Hale Station between 5:45 PM and 8:15 PM. Of these, about 61% will arrive on foot from the stadium, 30% interchange from National Rail train services from Northumberland Park, and 17% will interchange from THFC shuttle bus services.

15.5.102 Assuming four entry gates and five exit gates for the National Rail gateline, a small queue is anticipated at the exit gateline with peak entry flows forecast between 6:15 PM and 7:00 PM. All passengers alighting from National Rail services will be able to clear the gateline within two minutes of the train’s arrival.

15.5.103 Some passengers alighting from the shuttle bus will board National Rail services arriving from Northumberland Park. Analysis shows that all of these spectators will be able to board the next available train after their arrival. Although trains will leave Northumberland Park ‘at capacity’, the number of people alighting at Tottenham Hale (to interchange to London Underground) exceeds those wishing to board, leaving sufficient capacity for those boarding. The number of people waiting on the platform to board will peak at 65, so no capacity issue is anticipated.

15.5.104 Entrance to the ticket office provides sufficient capacity to accommodate all flows entering the station. Entry into the London Underground part of the station would be via six automated ticket gates and one...
wide aisle gate. This matches the vertical circulation capacity within the station, and therefore prevents any queue forming at the head of the stairs/escalator or in the gateline run-off area. This requires use of the stairs, in addition to the escalators, for vertical circulation. Some queuing is anticipated at the gateline with a maximum queue duration of 22 minutes, a maximum queue size of 399 people and a maximum delay of 3 minutes. The majority of passengers will not experience any delay.

15.5.105 As highlighted previously, each London Underground platform has capacity for approximately 1,000 people. The peak anticipated occupancy at Tottenham Hale is approximately 220 passengers for southbound services and 120 passengers for northbound. For both platforms, densities experienced are below the planning standards for Normal Operations, suggesting that conditions on the platform during the post-match will operate safely without management intervention. In both directions, all passengers would be expected to board the first train after arriving on the platform.

**Bus**

15.5.106 An overview of bus services for the THFC stadium has been set out within the relevant section of this chapter. With respect to the NFL scenario, the following information has been devised.

15.5.107 During the pre-match period, northbound flows on High Road have the option to use four bus routes (149, 259, 279 and 349). Most spectators are expected to interchange onto buses at Seven Sisters, although some spectators will travel on local buses from further south. Analysis suggests there may be a shortfall in capacity between 11:45 AM and 2:00 PM. However, if full plated capacity is used (and current matchday behaviour suggests that this will be the case), this capacity shortfall will be significantly reduced. It may be that interventions are put in place at Seven Sisters during this period to encourage efficient boarding and use of capacity. If there is a short-lived capacity shortfall, spectators unable to board buses may choose to walk to the stadium instead.

15.5.108 During the post-match period, southbound flows on High Road have the option to use the same four bus routes. Most spectators are expected to interchange at the Seven Sisters Station, although some spectators will travel further south on local buses. This analysis suggests that there will be no shortfalls in capacity and that every spectator will be able to board the first bus, except at 7:30 PM.
Conclusion

15.5.109 In staging NFL games at the new stadium, there will be no additional transport strategy challenges to those already being addressed by the Club. Similar to the weekday football matches, Sunday NFL spectators will be encouraged to walk, cycle or use the extensive London transport system comprised of National Rail, London Underground and London bus services.

15.5.110 Although the London transport system will be less burdened on a Sunday by low work commuter travel, constraints on these systems will still arise with respect to spectator flows, platform capacities, queue lengths, queue durations and delays. Having identified where and when these constraints arise however, they can be managed effectively and kept to a minimum so that spectator delays will be only a matter of minutes, whilst ensuring high levels of safety for spectator travel to and from the NFL games.

Stadium – Concerts

15.5.111 It is anticipated that the new stadium will be used as a venue for other major events, including concerts. Scheduling of concerts at the new stadium requires a separate licensing process, so will be covered in more detail at the time of that application. The management requirements associated with the staging of concerts are slightly different to those associated with football matches, as the behaviour of visitors is likely to differ.

15.5.112 This section presents the factors that have been used to derive a forecast of visitor travel patterns associated with a concert at the new stadium. As the current stadium does not currently host non-football major events, the assumptions are based on evidence from other stadiums. The profile of visitors’ behaviour has been derived from a review of profiles recorded for concerts taking place at other London venues.

15.5.113 Forecasts have been developed for a concert scenario with projections for both 45,000 visitors and 55,000 visitors. The objective is to understand the transport-related challenges that may be associated with a concert; in particular, where they differ from those expected on a match-day.

15.5.114 The forecast has been generated and analysed using the same tools as the match-day scenarios. The key assumptions are:

- Venue capacity of 45,000 or 55,000, depending on the layout of the concert;
- The concert will take place on a Saturday evening; and
- The main act will take the stage at 8:00 PM and finish at 10:00 PM with no supporting acts.

15.5.115 The assumption that there are no supporting acts creates more acute arrival and departure profiles that would be expected in reality, leading to robust worst-case forecasts.

15.5.116 The transport demand assessment has not be fully optimised, as was the case with the Football scenario, because attendees are expected to have far less local knowledge. The results do show variances between the four stations which would be reduced by optimisation of the demand forecasts and this would be the subject of further analysis as part of the preparation of the Event Management Plan that would be a licensing requirement of LBH. Given that many spectators would wish to use the Victoria Line this could be managed through recommended route for different stadium exit points.
Arrival and Departure Profiles

15.5.117 It is assumed that:

- All attendees are in the stadium by the time the main act takes to the stage; and
- The stadium arrival profile is applied irrespective of mode of transport used, and whether or not attendees are visiting other locations in the local area prior to the event.

15.5.118 The expected arrival profile for concerts is shown in Table 15.15, reflecting the moment attendees enter the stadium from the local area. The arrival profile is relatively even, with a steady flow of visitors into the stadium between 90 and 15 minutes before the concert begins.

Table 15.15 Assumed Attendee Arrival Profile at the stadium

<table>
<thead>
<tr>
<th>Minutes before kick-off</th>
<th>Proportion of spectators arriving - Saturday Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15 minutes before kick-off</td>
<td>2.5%</td>
</tr>
<tr>
<td>15-30 minutes before kick-off</td>
<td>10.0%</td>
</tr>
<tr>
<td>30-45 minutes before kick-off</td>
<td>12.5%</td>
</tr>
<tr>
<td>45-60 minutes before kick-off</td>
<td>12.5%</td>
</tr>
<tr>
<td>60-75 minutes before kick-off</td>
<td>12.5%</td>
</tr>
<tr>
<td>75-90 minutes before kick-off</td>
<td>12.5%</td>
</tr>
<tr>
<td>90-105 minutes before kick-off</td>
<td>12.5%</td>
</tr>
<tr>
<td>105-120 minutes before kick-off</td>
<td>7.5%</td>
</tr>
<tr>
<td>120-135 minutes before kick-off</td>
<td>7.5%</td>
</tr>
<tr>
<td>135-150 minutes before kick-off</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

15.5.119 The stadium departure profile is shown in Table 15.16, again reflecting the moment attendees pass the gatelines back onto the public highway. This model takes into account some early departures, which tend to be a key feature of concerts. The departure profile has a peak in the first 15 minutes after the end of the concert.
Table 15.16 Assumed Attendee Departure Profile from the stadium

<table>
<thead>
<tr>
<th>Minutes after End of Concert</th>
<th>Proportion of spectators leaving - Saturday Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-30 minutes before end</td>
<td>5%</td>
</tr>
<tr>
<td>0-15 minutes before end</td>
<td>15%</td>
</tr>
<tr>
<td>0-15 minutes after end</td>
<td>65%</td>
</tr>
<tr>
<td>15-30 minutes after end</td>
<td>8%</td>
</tr>
<tr>
<td>30-45 minutes after end</td>
<td>8%</td>
</tr>
<tr>
<td>45-60 minutes after end</td>
<td>0%</td>
</tr>
</tbody>
</table>

National Rail

15.5.120 The two National Rail stations that will accommodate concertgoers are Northumberland Park and White Hart Lane. The splits between these two stations are shown in Table 15.17 and Table 15.18.

Table 15.17 Assumed Proportions of Attendee Arrivals by Rail from each Direction

<table>
<thead>
<tr>
<th>Station</th>
<th>Split of Demand - Saturday Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>From Central London (incl. those interchanging at TH and SVS)</td>
</tr>
<tr>
<td>White Hart Lane NR</td>
<td>66.7%</td>
</tr>
<tr>
<td>Northumberland Park NR</td>
<td>64.7%</td>
</tr>
</tbody>
</table>
Table 15.18 Assumed Proportions of Attendee Departures by Rail from each Direction 45,000 Attendee Scenario

<table>
<thead>
<tr>
<th>Station</th>
<th>Split of Demand - Saturday Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To Central London (incl. those interchanging at TH and SVS)</td>
</tr>
<tr>
<td>White Hart Lane NR</td>
<td>68.0%</td>
</tr>
<tr>
<td>Northumberland Park NR</td>
<td>66.7%</td>
</tr>
</tbody>
</table>

**Northumberland Park Station**

15.5.121 The majority of attendees will travel towards central London from this station.

15.5.122 In the departure scenario for 55,000 attendees, queues are anticipated to form outside the station for access to the northbound platform. It is assumed that the capacity of the platform is capped at 700 people, as this broadly matches the capacity per train, and there are several occasions where access to the platform would need to be controlled. The maximum queue size would be 2,031 spectators. The longest delay for any individual from the time they arrive at the station to boarding a southbound train is 47 minutes. As is the case for football matches, this would be controlled with queue management and stewarding at the station, and will be more fully discussed as part of the separate licensing process for concerts.

**White Hart Lane Station**

15.5.123 In the departure scenario for 55,000 attendees, queues are anticipated to form outside the station for access to the southbound platform. The maximum delay for any individual from the time they arrive at the back of the queue to the point at which they board a train is 29 minutes. The queue will clear in approximately 65 minutes.

15.5.124 Likewise, for the 45,000-capacity scenario, queues are anticipated to form, although slightly smaller and with a shorter maximum wait time of 26 minutes and with the queue clearing completely in approximately 45 minutes.

15.5.125 The key factor affecting the clearance rate and the size of queue is the available train capacity. Again, the queue management and stewarding procedures will be resolved more fully as part of the separate licensing process for concerts.

**Conclusions**

15.5.126 Station capacities are not exceeded for arrivals in either of the two scenarios for stadium capacity.

15.5.127 For departures, with 55,000 attendees, 47% of attendees will wait for 10 minutes or less at White Hart Lane station to travel southbound, while only 3% will wait for 26 – 30 minutes. There is no wait to travel northbound from this station. At Northumberland Park station, 30% of attendees will wait for 10 minutes or less, while 25% will wait for more than 30 minutes travelling southbound. The strain on the northbound trains will be less than this, with 70% of attendees waiting for less than 10 minutes. Crowd management...
either outside the station or at the ticket office will be an extension of the current plan in place to deal with pre- and post-match conditions at Tottenham Hotspur matches.

15.5.128 In departure for the 45,000 capacity scenario, 49% of attendees will wait for 10 minutes or less at White Hart Lane station to travel southbound, while only 2% of attendees will wait for more than 21 minutes. There is no delay to northbound travel. At Northumberland Park Station, 48% of attendees will wait for 10 minutes or less, while 1% of attendees will wait for more than 30 minutes. This will not require crowd management, providing vertical circulation routes are well utilised.

**London Underground**

15.5.129 The two London Underground stations that will accommodate concertgoers are the Seven Sisters Interchange and Tottenham Hale Interchange.

15.5.130 Crowd management will be an extension of the current plan in place to deal with pre- and post-match conditions at football matches.

**Seven Sisters Interchange**

15.5.131 During the pre-event period, the interchange flow between London Underground and National Rail is the most challenging. This is principally due to the coincidence of high attendee flows and Event Day northbound services. The assessment of the 55,000-attendee scenario shows there are occasions where some people will be unable to board the first northbound train. However, all waiting passengers will be able to board the subsequent train. No such delay exists for the 45,000 scenario.

15.5.132 During the post-event period, assuming that the station infrastructure continues to operate at the same level of efficiency as has been observed in existing conditions, there will be some queuing outside the station on High Road, with entry flows managed to match the internal capacity of the route through to the Victoria Line southbound platforms. The analysis indicates that any delays experienced would be a matter of minutes, although queues will be formed outside the station for up to 45 minutes. In the departure scenario for 55,000 attendees, there are some shortfalls of capacity at both stations. To ensure that queuing and congestion does not take place inside the station, access to the station from High Road will be regulated, requiring a management plan to be adopted.

**Tottenham Hale Interchange**

15.5.133 The projection for flow rates through this station are based on actual spectator throughputs at Seven Sisters station. Crowd management will be an extension of the current plan in place to deal with pre- and post-match conditions at football matches.

15.5.134 In the arrival scenario for both 55,000 and 45,000 attendees, and for both platforms, densities experienced are below the planning standards for normal operations, suggesting that conditions on the platform during the post-match should operate safely without management intervention.

15.5.135 In the departure scenario for 55,000 attendees, trains will leave Northumberland Park ‘at capacity’, and the number of people alighting at Tottenham Hale (to interchange to London Underground) will exceed those wishing to board. The number of people waiting on the platform to board will peak at approximately 80, so no capacity issues are anticipated. The maximum delay for any individual will be 15 minutes, with a queue duration of 63 minutes.
15.5.136 It is anticipated that entry to the ticket office will be controlled to match the gateline capacity so that the queues can be managed outside the building, preventing potential obstruction to interchange flows that could occur without this measure.

**Conclusions**

15.5.137 Tottenham Hale Station in its future configuration has the capacity to accommodate the forecast attendee demand in addition to ‘regular’ use of the station before and after a concert. This includes an uplift in demand of more than 20% in the period up to the forecast year of 2021.

15.5.138 During the pre-concert period, the critical capacity constraint is the vertical circulation between the Victoria Line platform level and the ticket office, with the limited area at the base of the escalator/stairs before the queues form back as far as the platform. Calculations suggest that to avoid extensive queuing in this area, it is important that high train frequencies are maintained (to spread demand across more trains) and that use of the stairs is encouraged.

15.5.139 In the post-concert period, queuing is anticipated at the entrance to the station for those arriving on foot or by shuttle bus. Again, vertical circulation is the key constraining factor.

15.5.140 The peak queue in the 55,000-attendee scenario would be 2,031 people and some crowd management is therefore required. However, it is not anticipated that any individual would be delayed for more than 15 minutes. Crowd management will be an extension of the current plan in place to deal with pre- and post-match conditions at football matches.

**Bus**

15.5.141 If full plated capacity is used (and current Major Event Day behaviour suggests that this could be the case), any capacity shortfall will be significantly reduced. It may be that interventions are put in place at Seven Sisters during this period to encourage efficient boarding and use of capacity. If there is a short-lived capacity shortfall, and it is more than 30 minutes before the event starts, attendees unable to board buses may choose to walk to the stadium instead.

15.5.142 In the 55,000-attendee scenario, there is a small shortfall in arrivals. However, if managed efficiently as suggested above, this will be significantly reduced. If interventions at Seven Sisters are put in place during the periods of peak use, the shortfall will be short-lived. As it will occur more than 30 minutes before the event starts, attendees unable to board buses have time to walk to the stadium instead, if they so choose.

15.5.143 In the 45,000-attendee scenario, there is available capacity to accommodate all attendees, although this may rely on interventions in place at Seven Sisters during peak use periods to encourage efficient boarding and use of capacity.

15.5.144 There is no shortfall in capacity for departures in either the 55,000 or 45,000 capacity scenarios.

**Conclusions**

15.5.145 Most attendees (72%) will arrive between 15 – 105 minutes before the start of the concert. The flow of attendees is consistent throughout this period. National Rail and London Underground services will experience the greatest proportion of attendees arriving directly to the stadium. In the 55,000-attendee scenario, some crowd management is therefore required to prevent potential obstruction to interchange flows.

Tottenham Athletic Football Club Limited

September 2015

15.36
scenario, Tottenham Hale Station will experience queues at the bottom of the escalator, and there are possible shortfalls in capacity for the shuttle bus for one hour (18:30 – 19:30). This would not translate into a risk to safety. In both of these, delays to attendees may be reduced by effective operational loading and capacity management.

15.5.146 Although there are minor shortfalls in capacity, this would not translate into a risk to safety or station operations.

15.5.147 Most attendees (65%) will depart the stadium within 15 minutes of the end of the concert. Because of this acute demand, there will be greater strain on all modes of transportation. National Rail and London Underground would experience the greatest proportions of attendees departing. However, this does not translate to a risk to safety or station operations. Crowd management will be an extension of the current plan in place to deal with pre-Event and post-Event conditions at football matches.

15.5.148 In the 55,000-capacity scenario, the greatest delays would take place on the National Rail and London Underground. Seven Sisters Station would experience a queue lasting 40 minutes, with no individual waiting more than 13 minutes. Tottenham Hale would experience a queue for 63 minutes, with no individual waiting more than 15 minutes. Northumberland Road would experience a queue for 90 minutes, with 80% of individuals waiting less than 20 minutes. White Hart lane would experience a queue for 65 minutes, with 90% of individuals waiting less than 20 minutes. Where queues exist, they can be managed with queue management and stewarding measures, details of which will be resolved as part of a separate concert licensing process, but is likely to be an extension of the current plans in place to deal with pre- and post-match conditions at football matches.

15.5.149 In neither of the two capacity scenarios do any of the capacity constraints translate into a risk to safety or station operations.

Residential Units and Serviced Apartments

15.5.150 The best comparator for the proposed development is felt to be the residential units associated with the Emirates Stadium project. Here, even at parking ratios of 0.62-0.82 spaces per unit, there are still some unallocated spaces. The actual utilization is closer to 0.55 spaces per apartment. The trip generation per unit is 0.14 two way trips per day, i.e. two trips per week.

15.5.151 Taking into account the census data for journey to work by car and public transport, and the previous trip generation assumptions, it is proposed that for the revised NDP proposals a daily trip rate of 3.5, a car trip rate per unit of 0.31, compared to 0.14 at Holloway, and an 8.9% car use compared to 4.1% at Holloway. The key car trip rate for a car owning household in the new development would be 0.67 per unit with a car mode share of 19%.

15.5.152 The analysis indicates that there would be approximately:

- 39 cars entering or leaving the site in the morning peak;
- 37 cars entering or leaving the site in the evening peak; and
- 200 cars entering and 200 cars leaving the Project Site every day (total c.400).

15.5.153 These trips would result in a very modest impact on the surrounding highway network. It is considered that there would be no significant impact on the network.
Tottenham Experience and Non-Major Event Day Attractions

15.5.154 The proposed Non Major Event Day activities include:

- The Tottenham Experience
- Conferences and banqueting
- Sky Walk
- Extreme Sports Centre

15.5.155 Estimates for the number of visitors have been made using relevant comparators. Cautious assumptions for combined trips and allowances for variations on a day to day basis have been incorporated into the analysis. On a busy day it is estimated that the combined visitor attractions would generate 1,655 person trips to and from the local area.

15.5.156 The modal split assumptions/targets are that 10% of the journeys would be cars/taxis with an average occupancy of 2 visitors per trip. Half (50%) of the visitors are assumed to use the local rail services at White Hart Lane and Northumberland Park before walking to the stadium.

15.5.157 A total of 20% of visitors are assumed to use local bus services – in particular the services that connect to the Victoria Line at Seven Sisters station. 5% of visitors are expected to arrive in organised coaches – which would be equivalent to 2-3 coach trips per day. Finally, 5% of visitors will walk or cycle to the visitor attractions. However, it is expected that these figures will change on a day to day basis depending on the activities running at the time.

15.5.158 The trips generated by the health centre and hotel have also been estimated and the cumulative impact of the southern development considered including the residential elements and the Tottenham Experience.

15.5.159 The numbers of vehicles using the Park Lane/High Road Junction has been forecast, including the trips generated by the new development. The key conclusion is that even with the additional trips from the southern development, the total vehicle flows of up to 1,374 in the peak hour of 0800 - 0900 are less than those previously forecast for a 2016 baseline (1,662 vehicles in the AM peak), without the southern development. This is due to the fact that background traffic flows have decreased significantly over the last few years. Therefore it is not considered that there will be a significant impact on the highway network.

15.5.160 It is therefore concluded that none of these outcomes are likely to cause any significant impacts on with travel capacity in the local transport networks.

15.6 Additional Mitigation, Compensation and Enhancement Measures

Construction

15.6.1 The key mitigation measure for construction traffic will be the effective caps of 75 HGV arrivals and departures per day. THFC will seek to maximise the re-use of the excavated material to minimise the spoil removal and the future need to import aggregate – a double benefit. The use of a local work site will also reduce the length of construction vehicle trips for concrete deliveries.
15.6.2 Without the Construction Compound site all the construction traffic would route to the stadium construction site by way of the A1010 High Road/Fore Street that connects to site to the A406 North Circular Road. This route has been adhered to in the previous stages of the Northumberland Development Project construction. This would still be the route for the construction traffic other than the concrete deliveries.

15.7 Assessment Summary and Residual Environmental Impacts and Effects

Introduction

15.7.1 This report considers a range of transport issues associated with the redevelopment of the THFC stadium, located in the northeast of the London Borough of Haringey. The Project comprises a new world class stadium with a capacity of 61,000, with provision of a range of new facilities which will enhance the event day experience for spectators.

15.7.2 The document ‘Transport Assessment Volume 2 – Existing Conditions’ provides a description of the existing stadium, establishing the baseline environment from which the relative event-day impacts of the proposed stadium upgrade have been assessed.

Planning Policy

15.7.3 The planning submission has been developed within a framework of national, regional and local planning policies and guidance. National guidance sets the general objectives, with regional and local policies creating more specific guidance relevant to the local setting.

15.7.4 For developments, the policies promote two main aims for transport – to promote non-car travel, and to maintain free-flowing road networks. The new stadium achieves these aims through a broad set of measures aimed at encouraging local trips, constraining parking through the increased CPZ, improving cycling, walking and public transport routes, increasing public transport capacity, and using improved communication with spectators to encourage and balance use of the available public transport nodes.

Transport Strategy

15.7.5 The development of the stadium has been founded on a transport strategy which focuses on removing the barriers to sustainable travel, assisted by the provision of an expanded event day CPZ covering 716 hectares.

15.7.6 The site is very well served by public transport in the form of buses, rail access and the London underground, with Seven Sisters and Tottenham Hale stations, located to the south of the Project Site, acting as key transport interchanges. This level of provision, coupled with the management plans being promoted through the new stadium, will help to shape the way in which future spectators will choose to travel.

15.7.7 The TfL London Travel Report 2007 presents statistics which indicate that should the bus service provision trends be projected forwards then the future service provision would be sufficient to meet the proposed demand for bus services to and from Seven Sisters station. However, THPCL are committed to providing financial support to TfL in order to bring forward any improvements to bus travel capacity. Furthermore, new stops, changes to bus stop locations, a new diversion route, and junction
improvements will all serve to additionally support the increased demand.

**Trip Generation and Assessments**

**Stadium**

15.7.8 The trip generation associated with the regenerated stadium proposals was established using assessments of the local transport capacities, existing transport surveys, match day questionnaires and validated using experience from the recently built Emirates stadium, which has a similar fan base. In addition the effect of improving the onsite facilities is shown to attract and retain spectators, so that they arrive early and remain on site following an event. This reduces the peak demands normally associated with arriving and departing spectators.

15.7.9 The resulting assessments have shown that the improved stadium and associated improved public realm, with support from stewarding and effective management, will be able to disperse spectators much more efficiently than is currently experienced at the existing stadium, such that any High Road diversions could be lifted within 20 minutes of an event ending. Diversions are currently in place for approximately 30 minutes. This is largely the result of away fans being located in the prominent southwest corner of the site. The proposed stadium will see them relocated to the northeast corner and closer to the coach parking.

15.7.10 Assessments of the rail and underground impact have demonstrated that post-event management at the relevant entry points will be required in order to safely regulate access, and a range of proposals have been reported to allow this to be implemented. Improvements to station facilities will also support the increased numbers, as part of which THPCL is proposing to adopt White Hart Lane station and to contribute towards works to Tottenham Hale LUL station.

15.7.11 To provide a robust assessment the capacity assessments have been undertaken with the stadium impact at full capacity, and have shown that the various transport access points are cleared of spectator queuing well within an hour.

15.7.12 The Coach Travel Strategy will identify a package of proposals that, as a longer term goal, will make it conceivable for up to 5% of home supporters to travel by coach, rising over time from the currently proposed 2.5% mode share. This provides a scenario within which many of the impacts on other modes could be reduced.

15.7.13 The concert scenario presents a case whereby the transport network is at the limit of what is likely to be an acceptable outcome in terms of queues and delays. Further mitigation measures are likely to be necessary. The means of improving the reported outcome will be delivered as part of the transport strategy for the license application for any particular event.

15.7.14 Work on the Transport Assessment so far has included both generalised demand forecasting and more detailed mode-by-mode analysis of the capacity of the public transport routes and capability of existing and future networks to carry the increased demand that is expected.

15.7.15 This report has demonstrated that with the proposed mitigation measures and transport management plans in place, agreed between THPCL, the London Borough of Haringey, and the Metropolitan Police Service, there is sufficient capacity to safely and effectively transport the anticipated spectator demand to and from the stadium.
## Table 15.19 Traffic and Transport Assessment Summary

<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance</th>
<th>Additional Mitigation</th>
<th>Residual Impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavation activity, site preparation, piling and foundations - HGV Impact on highway network</td>
<td>Low</td>
<td>Negative</td>
<td>Low</td>
<td>Minor</td>
<td>Routeing and scheduling of construction HGVs and delivery times</td>
<td>Very Low</td>
<td>Minor - Neutral</td>
</tr>
<tr>
<td>Construction of stadium – HGV Impact on highway network</td>
<td>Low</td>
<td>Negative</td>
<td>Medium</td>
<td>Minor</td>
<td>Routeing and scheduling of HGVs and delivery times Use of construction compound near White Hart Lane Stations</td>
<td>Very Low</td>
<td>Minor - Neutral</td>
</tr>
<tr>
<td>Construction of southern area uses – HGV Impact on highway network</td>
<td>Low</td>
<td>Negative</td>
<td>Very Low</td>
<td>Neutral</td>
<td>Routeing and scheduling of construction HGVs and delivery times</td>
<td>Very Low</td>
<td>Minor - Neutral</td>
</tr>
<tr>
<td><strong>Operational Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative additional trips on the highway network. Local roads around the Project Site eg Park Lane (non-event day)</td>
<td>Low</td>
<td>Negative</td>
<td>Low</td>
<td>Minor</td>
<td>Local traffic flows much lower. Local traffic congestion reduced by northern development highway improvements. New CPZ implemented by LBH. Major scheme to remove Tottenham Hale Gyratory.</td>
<td>Low</td>
<td>Minor</td>
</tr>
<tr>
<td>Cumulative additional trips on rest of the highway network (non-event day)</td>
<td>Very Low</td>
<td>Negligible</td>
<td>Negligible</td>
<td>Neutral</td>
<td>Local traffic flows much lower. Local traffic congestion reduced by northern development highway improvements. New CPZ implemented by</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Additional passengers on rail services, Underground services and bus services (non-event day)</td>
<td>Low</td>
<td>Negligible</td>
<td>Negligible</td>
<td>Neutral</td>
<td>Once completed service enhancements and station upgrades will improve the passenger experience. Improvements at Seven Sisters interchange. New bus station at Tottenham Hale. New Victoria Line timetable with increased frequency. New Tottenham Hale railway station, new Overground rolling stock. Upgrades to pedestrian environment along the High Road.</td>
<td>Medium positive</td>
<td>Minor positive</td>
</tr>
<tr>
<td>Pedestrians along the High Road. Additional pedestrians on non-event days</td>
<td>Medium</td>
<td>Negative</td>
<td>Low</td>
<td>Minor</td>
<td>Reconfiguration of footways along the High Road</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td>Event Day Road Closures</td>
<td>Low</td>
<td>Negative</td>
<td>Medium</td>
<td>Minor</td>
<td>Time that Road closures are in operation on event days will be reduced.</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Additional queues at rail stations and Underground stations event days. Impact on background users.</td>
<td>Medium</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td>Better pedestrian routes to public transport facilities Station Management Plans in operation Enhanced transport services and station improvements eg Seven Sisters Interchange. Event day CPZ has been</td>
<td>Low</td>
<td>Minor</td>
</tr>
</tbody>
</table>
extended. New Victoria Line timetable with increased frequency. New Tottenham Hale railway station, new Overground rolling stock, new shuttle bus services. Upgrades to pedestrian environment along the High Road.
16. Microclimate

16.1 Introduction

16.1.1 This chapter of the Environmental Statement (ES) reports the findings of an assessment of the likely significant wind microclimate effects of the Project. In particular it considers the potential effects of wind upon pedestrian comfort and safety and summarises the findings of a series of wind tunnel tests. The full results of the wind tunnel tests are presented within Appendix 16.1.

16.1.2 This chapter and the full technical report, has been prepared by BMT Fluid Mechanics. The chapter describes the relevant policies, the methods used to assess the potential effects, and potential effects on wind microclimate at the completed Project.

16.1.3 Where appropriate, the mitigation measures required to reduce adverse effects are identified within the chapter, alongside a summary of the expected residual effects.

16.2 Assessment Criteria and Methodology

Previous Assessment

16.2.1 The previously consented scheme has been assessed via wind tunnel testing in September 2014, identifying a number of wind hotspots, principally within the podium area to the south.

16.2.2 Subsequently, the massing of the developments in the podium area has been altered to the extent that the current assessment supersedes the results of the previous work.

Scoping Opinion

16.2.3 Although a formal Scoping Opinion was not sought the Scope of the EIA was based on the technical scope for the original 2010 ES and the Southern Addendum. A draft Scoping Report was sent to the Council on the 19th June 2015, for their informal comments and discussion. No informal comments were received in relation to the Microclimate assessment.

Legislative Context

16.2.4 The legislative context relating to the wind microclimate is contained within the national, regional and local planning policies.

Planning Policy and Guidance

16.2.5 The following sections of this chapter review the national, regional and local planning policy requirements in terms of wind microclimate.

National Planning Policy

16.2.6 The UK wide National Planning Policy Framework (NPPF) came into force in March 2012\textsuperscript{44}. There are no

\textsuperscript{44} National Planning Policy Framework, 2012
national planning policies directly relating to wind microclimate issues; however, the benefits of a high quality built environment are emphasised in the NPPF. An example of this is presented in paragraph 58: “…using streetscapes and buildings to create attractive and comfortable places to live, work and visit…”

Regional Planning Policy


16.2.8 The planning guidance contained within the London Plan 2011 places great importance on the creation and maintenance of a high quality environment for London. Under Policy 7.6B ‘Architecture’ the plan states that “…buildings and structures should:

- Be of the highest architectural quality;
- Be of a proportion, composition, scale and orientation that enhances, activates and appropriately encloses the public realm;
- Not cause unacceptable harm to the amenity of surrounding land and buildings, particularly residential buildings, in relation to privacy, overshadowing, wind and microclimate;
- Incorporate best practice in resource management and climate change mitigation and adaptation;
- Provide high quality indoor and outdoor spaces and integrate well with the surrounding streets and open spaces; and
- Be adaptable to different activities and land uses, particularly at ground level.”

16.2.9 Under Policy 7.7 – Location and Design of Tall and Large Buildings, the London Plan states that:

16.2.10 “Tall and large buildings should be part of a plan-led approach to changing or developing an area by the identification of appropriate, sensitive and inappropriate locations. Tall and large buildings should not have an unacceptably harmful impact on their surroundings;

a) Applications for tall or large buildings should include an urban design analysis that demonstrates the proposal is part of a strategy that will meet the criteria below. This is particularly important if the site is not identified as a location for tall or large buildings in the borough’s LDF;

b) Tall and Large Buildings should: … b) only be considered in areas whose character would not be affected adversely by the scale, mass or bulk of a tall or large building;… f) have ground floor activities that provide a positive relationship to the surrounding streets;

c) Tall buildings should not affect their surroundings adversely in terms of microclimate, wind turbulence…”

16.2.11 Wind microclimate is therefore an important factor in achieving the desired planning policy objective.

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47 Greater London Authority (2013); Revised Early Minor Alterations to the London Plan

48 Greater London Authority (2014); Draft Further Alterations to the London Plan
Additionally, consideration of pedestrian comfort has been referenced in Policy 5.3 - Sustainable Design and Construction, Policy 6.10 - Walking, Policy 7.4 - Local Character and Policy 7.5 - Public Realm and although no specific reference is made to wind microclimate, would imply the inclusion of wind as a factor for assessing levels of comfort within London’s external spaces.

16.2.12 The Revised Early Minor Alterations to the London Plan set out minor changes to London Plan 2011 Policy. These amendments do not affect the policies described above. In addition they do not contain any additional policies that are of relevance to wind microclimate.

16.2.13 In January 2014, the Mayor published draft Further Alterations to the London Plan for a twelve week period of public consultation. These alterations were considered at an Examination in Public held in September 2014 and published in March 2015. The Further Alterations do not affect the guidance already noted in the London Plan 2011 with respect to wind microclimate.

Local Planning Policy

16.2.14 Haringey’s Local Plan: Strategic Policies, published in March 201349, and corresponding saved policies from the superseded UDP50 do not contain any planning policies directly relating to wind microclimate issues.

Guidance/Best Practice

16.2.15 The Sustainable Design & Construction, Supplementary Planning Guidance (SPG), published in April 201451, under Section 2.3.7 ‘Micro-climate’ states “Large buildings have the ability to alter their local environment and affect the micro-climate……. One way to assess the impact of a large building on the comfort of the street environment is the Lawson Comfort Criteria. This tool sets out a scale for assessing the suitability of wind conditions in the urban environment based upon threshold values of wind speed and frequency of occurrence. It sets out a range of pedestrian activities from sitting through to crossing the road and for each activity defines a wind speed and frequency of occurrence. Where a proposed development is significantly taller that it’s surrounding environment, developers should carry out an assessment of its potential impact on the conditions at ground level, and ensure the resulting design of the development provides suitable conditions for the intended uses”.

16.2.16 The assessment of environmental wind flows in the built environment lies outside the scope of internationally recognised wind codes, which focus on wind loading issues. In addition, there are no handbooks or engineering methods from which reliable assessments of the complex environmental wind flows that shape the pedestrian level wind conditions can be derived and numerical / computational methods such as computational fluid dynamics do not readily apply to turbulent wind flows in the built environment.

16.2.17 A purposely-designed boundary layer wind tunnel study is the most well-established and robust means of assessing the pedestrian wind microclimate. It enables the wind conditions at the site to be quantified and classified in accordance with the widely accepted Lawson Criteria for comfort and safety.

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50 London Borough of Haringey (2013); ‘Haringey Unitary Development Plan Saved Policies (Post Local Plan Adoption)’, London
Baseline Data Collection

16.2.18 Baseline conditions at the Project Site have been assessed via an experience based desk study. Consequently, no baseline data has been acquired.

Assessment Methodology

16.2.19 The wind tunnel test results deliver a detailed assessment of the mean and gust wind conditions around the existing site and the Project for all wind directions in terms of pedestrian comfort and safety.

16.2.20 The methodology for quantifying the pedestrian level wind environment of the existing site and the Project is outlined below:

- Step 1: Measure the building-induced wind speeds at pedestrian level in the wind tunnel;
- Step 2: Adjust standard meteorological data to account for conditions at the site;
- Step 3: Combine these to obtain the expected frequency and magnitude of wind speeds at pedestrian level; and
- Step 4: Compare the results with the Lawson Criteria to ‘grade’ conditions around the site by reference to the planned/desired pedestrian activities.

Simulation of Atmospheric Winds

16.2.21 Wind is unsteady or gusty, and this ‘gustiness’ or turbulence varies depending upon the site. Modelling these effects is achieved by a series of grid, barrier and floor roughness elements to create a boundary layer that is representative of urban or open country conditions, as is appropriate.

Meteorological Data

16.2.22 Wind microclimate studies require that wind speed data obtained from a measurement station be transposed to the site of interest. The wind speed history, provided by weather centres such as the London Heathrow, is reformatted into the number of observations of mean hourly wind speeds within each of several wind speed ranges, for each wind direction and for each month of the year.

16.2.23 A mathematical model (the Weibull cumulative distribution) is then used to determine the probability that, for a given wind direction, a particular wind speed, will be exceeded.

16.2.24 The resulting weather centre wind data is transposed to open country terrain at sea-level, accounting for upwind terrain, topography and altitude for the weather centre, before being transposed to reference height at the site of the Project, accounting for upwind terrain, topography and altitude for the target site. The resulting annual and seasonal directional and wind speed probability distributions at the site, at a reference height of 50m above ground (the approximate height of the Project), are given in Figure 16.1 and Figure 16.2, respectively. As illustrated within these figures, the most frequent winds and the strongest winds at the site blow from South-West (225° E of N). These winds are the most common cause of problematic wind comfort conditions due to strong ground level wind acceleration around buildings.

16.2.25 North-easterly winds are common during spring. South-easterly winds are generally light, rarely occurring and usually do not cause adverse impacts on pedestrian level winds.
Measurement Technique and Data Analysis

16.2.26 Wind speed measurements at assessment locations were made using probes capable of measuring fluctuating pressure differences that are calibrated against wind speed. A system of probes running simultaneously was used to obtain results from 99 locations at a height corresponding to 1.5m at full scale.

16.2.27 Measurements were taken for a full range of wind directions in increments of 22.5° (0° coinciding with OS grid north). Recordings were taken for a sufficient length of time to determine the mean and gust wind speeds.

16.2.28 For each location the measured wind speeds were combined with long-term wind frequency statistics to assess the wind environment in terms of the exceedance of threshold wind speeds that relate to comfort levels for the intended/desired pedestrian use/activity, and to safety. Wind frequency statistics, covering a period of 10 years, were obtained from the London Heathrow weather centre and transposed, accounting for variations in terrain between the site and the weather centre, to apply directly to the site.

Figure 16.1: Annual and Seasonal Directional Probability Distribution at Site
Assessment Criteria

Pedestrian Safety Criteria

16.2.29 At each area investigated, the suitability of the pedestrian level wind environment in terms of safety is assessed based on the Lawson criteria for pedestrian safety. Safety is determined for the ‘able-bodied’ and for the ‘general public’. For the general public a wind speed of 15 metres-per-second occurring once per year is rated as unsafe, with the potential to de-stabilise the less able members of the public including the elderly, cyclists and children. Able-bodied users are more likely to be capable of defending themselves against extreme pedestrian level winds and thus experience distress at a higher threshold wind speed of 20 metres-per-second, once per year.

16.2.30 Details of the safety criteria are presented in Table 16.1 and are based on the exceedance of the threshold wind speeds, based on the mean hourly value and on the gust equivalent mean value, occurring once per annum.

---

52 London Docklands Development Corporation (1990); The Evaluation of the Windiness of a Building Complex before Construction, T V Lawson
Table 16.1: The Lawson safety criteria

<table>
<thead>
<tr>
<th>Threshold Mean-hourly Wind Speed Exceeded Once per Annum</th>
<th>Safety Rating</th>
<th>Qualifying Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 15 m/s</td>
<td>S2</td>
<td>Unsuitable for general public</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Less able and cyclists find conditions physically difficult</td>
</tr>
<tr>
<td>&gt; 20 m/s</td>
<td>S1</td>
<td>Unsuitable for able-bodied</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Able-bodied persons find conditions difficult. Physically impossible to remain standing during gusts.</td>
</tr>
</tbody>
</table>

Pedestrian Comfort Criteria

16.2.31 The assessment of wind conditions requires a ‘standard’ against which to benchmark the microclimate. The Lawson Comfort Criteria (LCC) has been established for around thirty years and have been widely used on building developments across the UK.

16.2.32 Lawson devised a scale for assessing the suitability of wind conditions in the built environment. The LCC define a range of pedestrian activities from sitting through to more transient activities such as crossing the road, and for each activity define a threshold wind speed and frequency of occurrence beyond which the wind environment would be unsuitable for the stated activity. The wind speeds and activities are described in Table 16.2.

16.2.33 The criteria reflect the fact that sedentary activity, such as sitting, requires a low wind speed for a reasonable level of comfort whereas for more transient activity (such as walking) pedestrians would tolerate stronger winds.

16.2.34 If the wind conditions exceed the threshold then the conditions are unacceptable for the stated activity. If the wind conditions are below the threshold then they are described as tolerable (or suitable) for the stated activity.
16.2.35 The assessment takes full account of seasonal variations in wind conditions and pedestrian activities. For example, conditions for recreational activities focus on summer, but also consider spring and autumn, whilst conditions for pedestrian thoroughfare, access or waiting (e.g. bus stops) consider all seasons, with winter usually being the critical season. The pedestrian level wind environment assessment is summarised in terms of suitability for various activities.

16.2.36 The activities considered, and their relation to the LCC, are summarised in Table 16.3.

<table>
<thead>
<tr>
<th>Suitability</th>
<th>Lawson Comfort Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>For long periods of sitting such as for an outdoor café.</td>
<td>‘Long-term sitting’ in summer.</td>
</tr>
<tr>
<td>For pedestrian ingress/egress at a building entrance, or short periods of sitting or standing such as at a bus stop, taxi rank, meeting point, etc.</td>
<td>‘Standing or short-term sitting’ in all seasons.</td>
</tr>
<tr>
<td>For leisure uses excluding long periods of outdoor sitting such as a park, children’s play area, etc.</td>
<td>‘Standing or short-term sitting’ from spring to autumn.</td>
</tr>
<tr>
<td>For access to and passage through the Project Site and surrounding area.</td>
<td>‘Pedestrian Transit’ / ‘Walking or strolling’ in all seasons.</td>
</tr>
</tbody>
</table>
Significance Criteria

16.2.37 With respect to wind microclimate, the significance of the environmental effects of the Project is based on the suitability of wind conditions at each location assessed within the study area against either the current or planned pedestrian activities (as appropriate), based upon the LCC. As such the locations and activities beyond the redline boundary of the Project (i.e. pedestrian footpaths) that would remain unchanged post development would be assessed against current activities; and where the introduction of the Project would alter the existing activities and built form, the associated locations would be assessed against the planned / desired activity.

16.2.38 In summary, the following criteria were used to assess likely wind conditions as a result of the Project:

16.2.39 **Major Beneficial**: Any effect on wind conditions which potentially improves pedestrian safety (such as an improvement in conditions from being considered unsafe to being considered safe).

16.2.40 **Moderate Beneficial**: Any effect on wind conditions that improves pedestrian comfort from unsuitable to suitable for planned activities.

16.2.41 **Minor Beneficial**: Any effect on wind conditions which improves pedestrian comfort from unsuitable to marginal/tolerable for planned activities, or from marginal/tolerable to suitable for planned activities.

16.2.42 **Negligible**: Any effect that does not alter the suitability of existing wind conditions with respect to planned activities.

16.2.43 **Minor Adverse**: Any effect on wind conditions which worsens pedestrian comfort from suitable to marginal/tolerable for planned activities, or from marginal/tolerable to unsuitable for planned activities.

16.2.44 **Moderate Adverse**: Any effect on wind conditions that worsens pedestrian comfort from suitable to unsuitable for planned activities.

16.2.45 **Major Adverse**: Any effect adversely affecting pedestrian safety.

Geographical Scope

16.2.46 A 1:200 scale model of the existing buildings at and surrounding the site within a 440 metre (m) radius of the centre of the site was constructed. The building proposals as part of the Project were also constructed and used on the wind tunnel model (shown in Figure 16.3).
16.2.47 The wind tunnel model was instrumented to measure the building-induced wind speeds at pedestrian level in and around the podium area of the Project, which has previously been identified as the area in which windier conditions may prevail.

**Cumulative Developments**

16.2.48 Based upon the Cumulative Development Schedule provided by the design team, the cumulative effect on the wind conditions in and around the Project is considered **negligible** given that there are no significant cumulative developments that would impact the wind microclimate within the modelled radius of 440m from the site.

**Assumptions and Limitations**

16.2.49 The wind tunnel model included deciduous trees in order to obtain conservative results.

16.2.50 As noted above, the baseline conditions for the Site have not been directly assessed by the wind tunnel tests. Instead, professional judgement has been used to assess baseline conditions.

16.2.51 Furthermore, the conditions for the Site during demolition and construction have not been directly assessed by the wind tunnel tests. Instead, professional judgement has been used to assess conditions during construction.
16.2.52 The scheme model has been constructed based on the design information supplied by the Design Team.

16.3 Baseline Conditions

16.3.1 Baseline conditions at the Project Site have been assessed via an experience based desk study.

16.3.2 Wind conditions within the vicinity of the existing site and within the surrounding area are largely considered to be suitable, both in terms of pedestrian comfort and safety, for the intended usage.

16.3.3 However, exceptions to this may occur, most noticeably where the massing of the existing stadium is more significant, where downdraughts and acceleration of the flow around corners could result in windier conditions.

16.4 Inherent Design Mitigation

16.4.1 Throughout the design of the Project, consideration has been given to microclimatic conditions of the surrounding receptors and amenity spaces. The consultants attended Design Team Meetings when massing and siting were being considered which highlighted areas of potential concern, assisting with the design process.

16.5 Potential Environmental Impacts and Effects and Additional Mitigation, Compensation and Enhancement Measures

Construction

16.5.1 During the demolition and construction works, there would be potential for wind to blow into and across any open areas of the site. However, given the dusty and untidy conditions typical of a construction site, pedestrians moving within the area would be expected to have lowered expectations, in terms of comfort. On this basis there are not expected to be any potential significant effects resulting from demolition works.

16.5.2 As construction of the Project progresses, the wind environment would gradually adjust to those of the completed project described below.

Occupation

16.5.3 The occupation of the Project has been assessed over multiple stages to provide an interim assessment of the opening day scenario, the impact of the construction phasing and the completed project conditions.

16.5.4 Opening Day Scenario (i.e. Stadium, Tottenham Experience, first storey of Health Centre and opening day Podium)

16.5.5 Full details of the suitability assessment for the opening day scenario, namely the stadium, shop, first storey of the health centre and opening day podium, without soft landscaping and wind mitigation measures and with existing surrounding buildings are presented in graphical format in Figures 16.4a and 16.4b.
Figure 16.4a: Wind microclimate summary for the opening day scenario, southern podium area
Safety

16.5.6 With the introduction of the initial phase of the Project, namely the opening day scenario, wind conditions are created in some areas that are considered safe for the able bodied, but unsuitable for the general public:

- Around the South-East of the stadium [Locations 54, 56, 58, 59 and 73].
- The effect of the Project on the wind environment at these locations is of major adverse significance.

Comfort - Thoroughfares

16.5.7 With the introduction of the initial phase of the Project, wind conditions at leisure thoroughfares in and around the site are generally rated as suitable, in terms of pedestrian comfort, for the intended use, with the exception of those to the South-East of the stadium [Locations 52, 55, 56, 57 and 73] where conditions are at best suitable for pedestrian transit. The latter represents a moderate adverse impact. At all other leisure thoroughfares the impact is negligible.

16.5.8 For the thoroughfare located to the South-East of the stadium that is intended for pedestrian transit only [Location 58], wind conditions are too windy for comfortable thoroughfare in the absence of mitigation, being rated as uncomfortable for all uses. This represents a moderate adverse impact.
Comfort – Entrances

16.5.9 With the introduction of the initial phase of the Project, wind conditions at entrances to the proposed stadium are considered unsuitable, in terms of pedestrian comfort, for ingress/egress from the building. This represents a moderate adverse impact.

16.5.10 Conversely, wind conditions at entrances in and around the remainder of the Project Site are considered suitable, in terms of pedestrian comfort, for ingress/egress from the building. This represents a negligible impact.

Comfort - Recreational Spaces

16.5.11 With the introduction of the initial phase of the Project, wind conditions at all recreational spaces in and around the site, are considered suitable, in terms of pedestrian comfort, for the intended use throughout the year. This represents a negligible impact.

Comfort – Outdoor Seating

16.5.12 With the introduction of the initial phase of the Project, wind conditions at the outdoor seating area to the East of the proposed shop are considered unsuitable, in terms of pedestrian comfort, for the intended use being suitable only for short term standing / sitting during summer in the absence of mitigation. This represents a moderate adverse impact.

Opening day scenario with soft landscaping and mitigation measures

16.5.13 The wind environment has been assessed for the opening day scenario with the inclusion of soft landscaping proposals and wind mitigation measures.

16.5.14 The proposed soft landscaping, presented graphically in Figure 16.5, comprised of the following:

- Planter, ~0.5m tall, with ~0.5m hedging and 9 x ~10m trees in South-East area of podium
- Planter, ~0.5m tall with 2 x ~10m trees in South-East area of podium
- 2x Planter, ~1m tall, with ~0.5m hedging in North-East area of podium
- 2x Planter, ~1m tall, with 3x 2.4m trees in North-East area of podium

16.5.15 Wind mitigation measures, presented graphically in Figure 16.6, comprised of the following:

- Screen, with a porosity of approximately 50%, and being approximately 2m tall x 1m wide located either side of the entrances along the southern and northern façade of the stadium
- Solid wall (being approximately 4m tall x 2m wide) located at the western entrance to the stadium
- Solid signs (being approximately 2m wide x 6m tall) suspended 3m above the podium from the SE Façade of the stadium.
- Site Hoarding (being approximately 2m high) around construction areas
Figure 16.5: Soft landscaping proposals, opening day scenario

- **Trees, ~2.4m tall**
- **Planter, ~1m tall**
- **Planter, ~0.5m tall, with ~0.5m hedging**
- **Planter, ~1m tall, with ~0.5m hedging**
Figure 16.6: Wind mitigation measures, opening day scenario

Figure 16.7a: Wind microclimate summary for the opening day scenario with the inclusion of soft landscaping and wind mitigation measures, southern podium area
Figure 16.7b: Wind microclimate summary for the opening day scenario with the inclusion of soft landscaping and wind mitigation measures, northern podium area

**Safety**

16.5.16 With the introduction of the proposed soft landscaping and wind mitigation measures to the initial phase of the Project, wind conditions in and around the Project Site are considered suitable, in terms of safety, for use by the general public. This represents a *negligible* residual effect.

**Comfort - Thoroughfares**

16.5.17 With the introduction of the proposed soft landscaping and wind mitigation measures, wind conditions at the majority of thoroughfares in and around the site remain suitable, or are improved such that they become suitable, in terms of pedestrian comfort, for the intended use. This represents a *negligible* residual effect.

16.5.18 A single exception to this remains to the South-East [Location 56] where conditions are rated as suitable, in terms of pedestrian comfort, for pedestrian transit only during the winter months, but is otherwise rated as suitable for the intended uses as leisure thoroughfare throughout the rest of the year. This represents a *moderate adverse* residual effect.

**Comfort – Entrances**

16.5.19 With the introduction of the proposed soft landscaping and wind mitigation measures, wind conditions at all entrances in and around the site remain suitable, or are improved such that they become suitable, in terms of pedestrian comfort, for ingress/egress from the buildings. This represents a *negligible* residual effect.
Comfort - Recreational Spaces

16.5.20 With the introduction of the proposed soft landscaping and wind mitigation measures, wind conditions at all recreational spaces in and around the site, remain suitable, in terms of pedestrian comfort, for the intended use throughout the year. This represents a negligible residual effect.

Comfort – Outdoor Seating

16.5.21 With the introduction of the proposed soft landscaping and wind mitigation measures, wind conditions at the outdoor seating area to the East of the proposed shop are improved such that they become suitable, in terms of pedestrian comfort, for the intended use. This represents a negligible residual effect.

Completed Podium (i.e. Stadium, Tottenham Experience, completed Health Centre and completed Podium)

16.5.22 The wind environment has been assessed for the completed podium, namely the stadium, shop, completed health centre and completed podium, with the inclusion of soft landscaping proposals and wind mitigation measures.

16.5.23 The proposed soft landscaping, presented graphically in Figure 16.8, comprised of the following:

- Planter, ~0.5m tall, with ~0.5m hedging and 9 x ~10m trees in South-East area of podium
- Planter, ~0.5m tall with 2 x ~10m trees in South-East area of podium
- 2x Planter, ~1m tall, with ~0.5m hedging in North-East area of podium
- 2x Planter, ~1m tall, with 3x 2.4m trees in North-East area of podium
- Stepped Planters, approximately ~1m tall on the southern podium with trees ~10m tall.

16.5.24 Wind mitigation measures for the opening day scenario were kept in place, with the position of the hoarding adjusted to correspond with the perimeter of the construction areas.
Figure 16.8: Soft landscaping proposals, construction phases

- Trees, ~2.4m tall
- Trees, ~10m tall
- Planter, ~1m tall
- Planter, ~0.5m tall, with ~0.5m hedging
- Planter, ~1m tall, with ~0.5m hedging

Complete podium, indicating proposed soft landscaping

Status: Preliminary
Drawing No: 431660/Thfc/3.3b
Prep: D. Hankin
Date: 9-Sep-15
Figure 16.9a: Wind microclimate summary for the completed podium with the inclusion of soft landscaping and wind mitigation measures, southern podium area
Safety

16.5.25 With the introduction of the completed podium and additional soft landscaping, wind conditions in and around the Project Site remain suitable, in terms of safety, for use by the general public. This represents a negligible impact.

Comfort - Thoroughfares

16.5.26 With the introduction of the completed podium and additional soft landscaping, wind conditions at all thoroughfares in and around the site remain suitable, or are improved such that they become suitable, in terms of pedestrian comfort, for the intended use. This represents a negligible impact.

Comfort – Entrances

16.5.27 With the introduction of the completed podium and additional soft landscaping, wind conditions at all entrances in and around the site remain suitable, in terms of pedestrian comfort, for ingress/egress from the buildings. This represents a negligible impact.
**Comfort - Recreational Spaces**

16.5.28 With the introduction of the completed podium and additional soft landscaping, wind conditions at all recreational spaces in and around the site, remain suitable, in terms of pedestrian comfort, for the intended use throughout the year. This represents a **negligible** impact.

**Comfort – Outdoor Seating**

16.5.29 With the introduction of the completed podium and additional soft landscaping, wind conditions at the outdoor seating area to the East of the proposed shop remain suitable, in terms of pedestrian comfort, for the intended use. This represents a **negligible** impact.

Completed Hotel (i.e. Stadium, Tottenham Experience, Health Centre, Hotel and Podium)

16.5.30 The wind environment has been assessed for the completed hotel, namely the stadium, shop, completed health centre, hotel and completed podium, with the inclusion of soft landscaping proposals and wind mitigation measures as per the completed podium scenario.

*Figure 16.10a: Wind microclimate summary for the completed hotel with the inclusion of soft landscaping and wind mitigation measures, southern podium area*
Safety

16.5.31 With the introduction of the proposed hotel, wind conditions in and around the Project Site remain suitable, in terms of safety, for use by the general public. This represents a **negligible** impact.

Comfort - Thoroughfares

16.5.32 With the introduction of the proposed hotel, wind conditions at the majority of thoroughfares in and around the site remain suitable, in terms of pedestrian comfort, for the intended use. This represents a **negligible** residual effect.

16.5.33 However, windier conditions to the South-West of the stadium result in location 21 becoming suitable for pedestrian transit only during the winter months. Conditions in this area are otherwise rated as suitable for the intended uses as leisure thoroughfare throughout the rest of the year. This represents a **moderate adverse** impact.

Comfort – Entrances

16.5.34 With the introduction of the proposed hotel, wind conditions at all entrances in and around the site remain suitable, in terms of pedestrian comfort, for ingress/egress from the buildings. This represents a **negligible** impact.

Comfort - Recreational Spaces

16.5.35 With the introduction of the proposed hotel, wind conditions at all recreational spaces in and around the

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**Figure 16.10b:** Wind microclimate summary for the completed hotel with the inclusion of soft landscaping and wind mitigation measures, northern podium area
site, generally remain suitable, in terms of pedestrian comfort, for the intended use throughout the year. This represents a negligible impact.

16.5.36 However, an exception occurs at the base of the proposed hotel to the North [Locations 22 and 23] where windier conditions prevail. This represents a moderate adverse impact.

Comfort – Outdoor Seating

16.5.37 With the introduction of the proposed hotel, wind conditions at the outdoor seating area to the East of the proposed shop become unsuitable, in terms of pedestrian comfort, for the intended use, being suitable for short term standing / sitting as opposed to longer term sitting. This represents a moderate adverse impact.

Completed Sports Development (i.e. Stadium, Tottenham Experience, Health Centre, Hotel, Sports Development and Podium)

16.5.38 The wind environment has been assessed for the completed hotel, namely the stadium, shop, completed health centre, hotel, sports development and completed podium, with the inclusion of soft landscaping proposals and wind mitigation measures as per the completed podium scenario.
Figure 16.11a: Wind microclimate summary for the completed sports development with the inclusion of soft landscaping and wind mitigation measures, southern podium area

Figure 16.11b: Wind microclimate summary for the completed sports development with the inclusion of soft landscaping and wind mitigation measures, northern podium area
Safety

16.5.39 With the introduction of the proposed sports development, wind conditions in and around the Project Site remain suitable, in terms of safety, for use by the general public. This represents a negligible impact.

Comfort - Thoroughfares

16.5.40 With the introduction of the proposed sports development, wind conditions at the majority of thoroughfares in and around the site remain suitable, in terms of pedestrian comfort, for the intended use. This represents a negligible residual effect.

16.5.41 However, windier conditions to the South-West of the stadium at location 21 remain suitable for pedestrian transit only during the winter months. Conditions in this area are otherwise rated as suitable for the intended uses as leisure thoroughfare throughout the rest of the year. This represents a moderate adverse impact.

Comfort – Entrances

16.5.42 With the introduction of the proposed sports development, wind conditions at the majority entrances in and around the site remain suitable, in terms of pedestrian comfort, for ingress/egress from the buildings. This represents a negligible impact.

16.5.43 However, the entrances to the East of the hotel [Locations 26 and 29] become unsuitable, in terms of pedestrian comfort, for ingress/egress from the building. This represents a moderate adverse impact.

Comfort – Recreational Spaces

16.5.44 With the introduction of the proposed sports development, wind conditions at all recreational spaces in and around the site, generally remain suitable, in terms of pedestrian comfort, for the intended use throughout the year. This represents a negligible impact.

16.5.45 However, whilst wind conditions at location 23 become suitable, in terms of pedestrian comfort, for the intended use, wind conditions to the East of the hotel [Location 68] and in the central podium area [Location 52] become unsuitable and to the North of the hotel [Location 22] remains unsuitable. This represents a moderate adverse impact.

Comfort – Outdoor Seating

16.5.46 With the introduction of the proposed sports development, wind conditions at the outdoor seating area to the East of the proposed shop remain unsuitable, in terms of pedestrian comfort, for the intended use. This represents a moderate adverse impact.

Complete Project (i.e Stadium, Tottenham Experience, Hotel, Extreme Sports Centre, Residential Towers, and Health Centre)

16.5.47 Full details of the suitability assessment for the completed Project, namely the stadium, shop, hotel, sports and residential developments, without soft landscaping and wind mitigation measures and with existing surrounding buildings are presented in graphical format in Figure 16.12.
Figure 16.12: Wind microclimate summary for the completed project

**Safety**

16.5.49 With the introduction of the completed project, wind conditions are created in some areas that are considered safe for the able bodied, but unsuitable for the general public:

- Around the South-East of the stadium [Location 58];
- Between the residential towers [Location 62];
- Around the South-East corner of the residential development [Location 40].
- The effect of the Project on the wind environment at these locations is of **major adverse** significance.

**Comfort - Thoroughfares**

16.5.50 With the introduction of the completed project, wind conditions at all thoroughfares in and around the site are considered suitable, in terms of pedestrian comfort, for the intended use as either leisurely strolling or pedestrian transit where appropriate. This represents a **negligible** impact.

**Comfort – Entrances**

16.5.51 With the introduction of the completed project, wind conditions at entrances to the stadium are considered unsuitable, in terms of pedestrian comfort, for ingress/egress from the building in the absence of wind mitigation measures. This represents a **moderate adverse** impact.

16.5.52 Conversely, wind conditions at entrances in and around the remainder of the Project are considered suitable, in terms of pedestrian comfort, for ingress/egress from the building. This represents a **negligible**
Comfort - Recreational Spaces

16.5.53 With the introduction of the completed project, wind conditions at recreational spaces in and around the podium area are generally considered suitable, in terms of pedestrian comfort, for the intended use. This represents a negligible impact.

16.5.54 Exceptions to this occur between the hotel and sports development [Locations 23 and 24], on the podium of the sports development [Location 31] where windier conditions prevail. This represents a moderate adverse impact.

16.5.55 However, wind conditions at recreational spaces within the residential development are largely unsuitable, in terms of pedestrian comfort, for the intended use in the absence of mitigation measures. This represents a moderate adverse impact.

16.5.56 Exceptions to this occur at the southern extent of the podium [Locations 64 & 66] and the base of the south-eastern tower [Location 63] where conditions are rated as suitable, in terms of pedestrian comfort, for the intended use. This represents a negligible impact.

Complete Project with soft landscaping and wind mitigation measures

16.5.57 The wind environment has been assessed for the completed project with the inclusion of soft landscaping proposals and wind mitigation measures.

16.5.58 The proposed soft landscaping, presented graphically in Figure 16.8, comprised of the following:

- Trees (~5m tall) around the residential area and the sport development
- Trees (~10m tall) around the Project Site

16.5.59 Wind mitigation measures, presented graphically in Figure 16.9, comprised of the following:

- Tree (~1.8m tall) on the North-West corner of the South-East residential tower
- Hedge (~1m tall) along the North of the sport development
- Hedges (~1.6m tall) around the tops of the atriums, at the base of and on the roof terraces of residential developments and on the podium of the sport development
- Parapets (~1.6m tall) on roof terraces of residential developments
- Parapets (~1.2m tall) on podium of sport development
- Screen, with a porosity of approximately 50%, and being approximately 2m tall x 1m wide along the southern façade of the stadium
- Solid wall (being 4m tall x 2m wide) located at the western entrance to the stadium
Figure 16.13: Soft landscaping proposals, completed project
Figure 16.14: Wind mitigation measures, completed project
Figure 16.15: Wind microclimate summary for the completed project with the inclusion of soft landscaping and wind mitigation measures

**Safety**

16.5.60 With the introduction of the proposed soft landscaping and wind mitigation measures, wind conditions in and around the Project Site are considered suitable, in terms of safety, for use by the general public. This represents a **negligible** residual effect.

**Comfort - Thoroughfares**

16.5.61 With the introduction of the proposed soft landscaping and wind mitigation measures, wind conditions at all thoroughfares in and around the site are considered suitable, in terms of pedestrian comfort, for the intended use as either leisurely strolling or pedestrian transit where appropriate. This represents a **negligible** residual effect.

**Comfort – Entrances**

16.5.62 With the introduction of the proposed soft landscaping and wind mitigation measures, wind conditions at all entrances in and around the site are considered suitable, in terms of pedestrian comfort, for ingress/egress from the building. This represents a **negligible** residual effect.
**Comfort - Recreational Spaces**

16.5.63 With the introduction of the proposed soft landscaping and wind mitigation measures, wind conditions at the majority of recreational spaces in and around the site are considered suitable, in terms of pedestrian comfort, for the intended use. A single exception to this remains between the residential towers [Location 61] where windier conditions prevail, this represents a **moderate adverse** residual effect. At all other recreational spaces the residual effect is **negligible**.

**Comfort – Outdoor Seating**

16.5.64 With the introduction of the proposed soft landscaping and wind mitigation measures, wind conditions at the outdoor seating area to the East of the proposed shop are considered suitable, in terms of pedestrian comfort, for the intended use. This represents a **negligible** residual effect.

**Comfort - Balconies**

16.5.65 Wind conditions within balcony areas are considered suitable, in terms of pedestrian comfort, for the intended use as outdoor seating, with the exception of the balconies at the top of the tallest tower of the residential development [Locations 103 and 104] where wind conditions are suitable for outdoor viewing only, this represents a **moderate adverse** residual effect. At all other balcony areas the residual effect is **negligible**.

16.6 **Assessment Summary and Residual Environmental Impacts and Effects**

**Construction**

16.6.1 During the demolition and construction works, given the dusty and untidy conditions typical of a construction site, pedestrians moving within the area would have lowered expectations, in terms of wind comfort, than otherwise might be expected. As such, this is considered to be a **negligible to minor adverse** residual effect.

**Operation**

16.6.2 With the proposed soft landscaping scheme and wind mitigation measures, the residual effect on wind microclimate at the majority of locations in and around the Project Site is expected to be **negligible**, which implies that the wind microclimate would be suitable for the intended use. However, windier conditions persist at some locations representing a residual effect that is **moderate adverse**, which implies that there are outstanding comfort issues in these areas. A summary of the residual effects is provided in Table 16.4.
Table 16.4: Microclimate Residual Effects

<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance</th>
<th>Additional Mitigation</th>
<th>Residual Impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on construction site</td>
<td>Medium</td>
<td>Negligible</td>
<td>Neutral</td>
<td>Neutral</td>
<td>None</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td><strong>Operational Effects – Opening Day Scenario</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exceedance of safety criteria</td>
<td>High</td>
<td>Negative</td>
<td>High</td>
<td>Major</td>
<td>landscaping, screens/signs &amp; hoarding</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Wind effect on thoroughfares</td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td>landscaping, screens/signs &amp; hoarding</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Wind effect on entrances</td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td>side screens</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Wind effect on recreational spaces</td>
<td>High</td>
<td>Negligible</td>
<td>Neutral</td>
<td>Neutral</td>
<td>None</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Wind effect on outdoor seating</td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td>hoarding</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td><strong>Operational Effects – Completed Podium</strong></td>
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</tr>
<tr>
<td>Exceedance of safety criteria</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
<td>-</td>
<td>As per Opening Day Scenario with the addition of further landscaping to the southern podium area</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Wind effect on thoroughfares</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
<td>-</td>
<td>As per Completed Podium with the addition of further landscaping to the southern podium area</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Wind effect on entrances</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
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<td>As per Completed Podium with the addition of further landscaping to the southern podium area</td>
<td>Negligible</td>
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<tr>
<td>Wind effect on recreational spaces</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
<td>-</td>
<td>As per Completed Podium with the addition of further landscaping to the southern podium area</td>
<td>Negligible</td>
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</tr>
<tr>
<td>Wind effect on outdoor seating</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
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<td>As per Completed Podium with the addition of further landscaping to the southern podium area</td>
<td>Negligible</td>
<td>Neutral</td>
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<tr>
<td><strong>Operational Effects – Completed Hotel</strong></td>
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<td>Exceedance of safety criteria</td>
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<tr>
<td>Wind effect on thoroughfares</td>
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<td>As per Completed Podium</td>
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<tr>
<td>Wind effect on entrances</td>
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<td>As per Completed Podium</td>
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<tr>
<td>Wind effect on recreational spaces</td>
<td>High</td>
<td>Negative</td>
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<td>As per Completed Podium</td>
<td>Low</td>
<td>Moderate</td>
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<tr>
<td>Wind effect on outdoor seating</td>
<td>High</td>
<td>Negative</td>
<td>-</td>
<td>-</td>
<td>As per Completed Podium</td>
<td>Medium</td>
<td>Moderate</td>
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<tr>
<td><strong>Operational Effects – Completed Sports Development</strong></td>
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<td>Exceedance of safety criteria</td>
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<td>As per Completed Podium</td>
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<tr>
<td>Wind effect on thoroughfares</td>
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<td>As per Completed Podium</td>
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<td>Wind effect on entrances</td>
<td>High</td>
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<td>As per Completed Podium</td>
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<tr>
<td>Wind effect on recreational spaces</td>
<td>High</td>
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<td>Low</td>
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<tr>
<td>Wind effect on outdoor seating</td>
<td>High</td>
<td>Negative</td>
<td>-</td>
<td>Medium</td>
<td>Moderate</td>
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</tbody>
</table>

**Operational Effects – Completed Project**

| Exceedance of safety criteria       | High | Negative | High | Major | Landscaping & screens | Negligible | Neutral |
| Wind effect on thoroughfares        | High | Negligible | Neutral | Neutral | None | Negligible | Neutral |
| Wind effect on entrances            | High | Negative | Medium | Moderate | side screens | Negligible | Neutral |
| Wind effect on recreational spaces  | High | Negative | Medium | Moderate | Landscaping & balustrades | Low | Moderate |
| Wind effect on outdoor seating      | High | Negligible | - | - | None | Negligible | Neutral |
| Wind effect on balconies            | High | Negative | - | - | Landscaping & parapets | Low | Moderate |
17. **Daylight, Sunlight and Overshadowing**

17.1 **Introduction**

17.1.1 This chapter of the Environmental Statement (ES) assesses the likely significant environmental effects of the Project in terms of daylight, sunlight, overshadowing, light pollution and solar glare.

17.1.2 The technical analysis has been undertaken in accordance with the Building Research Establishment (BRE) Guidelines ‘Site Layout Planning for Daylight and Sunlight 2011: A Guide to Good Practice’ (2011) criteria.53

17.1.3 This chapter outlines the relevant policy context, describes the methodologies applied, the baseline conditions at the site and its surrounds and the potential effects associated with the Project. Where appropriate, mitigation is set out as necessary and the resulting likely residual effects are also identified.

17.1.4 This chapter considers the potential for cumulative daylight, sunlight, overshadowing, light pollution and solar glare effects (Type 2 effects) of the Project in combination with other development schemes. The potential for daylight, sunlight, overshadowing, light pollution and solar glare effect interactions and combined effects (Type 1 effects) are discussed in this Statement.

17.1.5 An assessment of the daylight and sunlight within the proposed residential blocks (as outline) are included within this Environmental Statement in Appendix 17.2.

17.1.6 This assessment and ES chapter has been produced by GIA and is supported by the following technical Appendices within Volume 3 (Technical Appendices):

- Appendix 17.1: Drawings of baseline, proposed and cumulative scenarios;
- Appendix 17.2: Detailed Analysis Results Of The Levels Of Daylight And Sunlight Amenity Within Residential Properties and Schools surrounding he Site for all scenarios;
- Appendix 17.3: Overshadowing results;
- Appendix 17.4: Solar Glare assessment; and
- Appendix 17.5: Daylight Potential Assessment.

17.2 **Assessment Criteria and Methodology**

17.2.1 The following sections of this ES Chapter provide a review of relevant legislation, guidance and national, regional and local planning policy requirements in terms of daylight, sunlight, sun on ground, light pollution and solar glare.

**Previous Assessment**

17.2.2 Whilst an assessment was carried out for the 2010 scheme and subsequent amendments it is considered that the changes are a magnitude that a new assessment is required.

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Legislative Context

17.2.3 The following sections of this ES chapter provide a review of relevant legislation, guidance and national and local planning policy requirements in terms of daylight, sunlight, sun on the ground, light pollution and solar glare.

National Legislation

Environmental Protection Act, Section 79 (1990)

17.2.4 Section 79 of the Environmental Protection Act, 1990 as amended by the Clean Neighbourhoods and Environment Act 2005, states the following with regards to light pollution:

17.2.5 “Artificial light emitted from premises so as to be prejudicial to health and nuisance constitutes a ‘Statutory Nuisance’ and it shall be the duty of every local authority to cause its area to be inspected from time to time to detect any statutory nuisances which ought to be dealt with under section 80 [or sections 80 and 80A] and, where a complaint of a statutory nuisance is made to it by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint”.

Planning Policy and Guidance

National Planning Policy


17.2.6 The National Planning Policy Framework adopted on the 27th March 2012 stipulates that “…planning policies and decisions should always seek to secure a good standard of amenity for existing and future occupants of land and buildings.”

Planning Practice Guidance (2014)

17.2.7 Launched last year the national Planning Practice Guidance does not include any further provisions in terms of daylight, sunlight, overshadowing, light pollution and glare, beyond that stated for the NPPF.

Regional Planning Policy


17.2.8 The key policies from the adopted London Plan of relevance to this assessment are detailed below:

17.2.9 Policy 7.6 states: “…buildings and structures should…not cause unacceptable harm to the amenity of surrounding land and buildings, particularly residential buildings, in relation to privacy, overshadowing, wind and micro-climate.”

17.2.10 Policy 7.7 notes that large buildings should not adversely affect their surroundings in terms of overshadowing and solar reflected glare: “Location and design of tall buildings should not affect their surroundings adversely in terms of microclimate, wind turbulence, overshadowing, noise, reflected glare, aviation, navigation and telecommunication interference.”

54 Statutory Office (1990) Environmental Protection Act, Section 79, 1990
56 Planning Practice Guidance (2014)
Interim Strategic Planning Guidance on Tall Buildings, Strategic Views and the Skyline in London (October 2001)

17.2.11 This interim guidance provides guidance in regards to tall buildings within London. It states that there are positive benefits to tall buildings in regards to safeguarding and enhancing London’s world city role. Within this guidance it states:

- “the issue of tall office buildings is first and foremost not one of economic need, but an issue of image, aesthetics, local public transport and servicing capacity”
- “Outside the City there are unlikely to be many opportunities for very tall office blocks in the West End, given the City of Westminster Council’s opposition to tall buildings in most locations. Tall buildings of up to 100 metres might be possible at a few locations such as Paddington, but even at Victoria opportunities are limited.”
- “It is no longer possible to provide sufficiently large buildings in the City in the form of low groundscrapers, even if that is what potential occupiers want. What they do want is quality buildings that can give them a sense of identity.”
- “The value of clusters of tall buildings from an urban design point of view has been widely recognised.”

Local Planning Policy
Haringey Development Management DPD 2013

17.2.12 The key policy from the adopted Development Management DPD for Haringey of relevance to this assessment is Policy DM2. It states that “development proposals should ensure appropriate levels of daylight and sunlight relevant to their function.”

17.2.13 It continues to note that “for example, a kitchen does not need to be naturally daylit or naturally sunlit but workspace need daylight for most types of work and it is important for healthy work life.”

17.2.14 It also states that “the default expectation should be that external amenity space (whether that is private, private communal, or communal recreation space) should as the BRE Guide recommends receive at least some sunlight every day for all but the darkest three months of the year.”

Other Relevant Policy, Standards and Guidance


17.2.15 Paragraph 4.1.8 of the English Heritage (EH) / Commission for Architecture and the Built Environment (CABE) Guidance on Tall Buildings recommends that the following criteria should be addressed in relation to new developments:

17.2.16 “The effect on the local environment, including microclimate, overshadowing, night-time appearance,

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59 Haringey (2013) Development Management DPD
60 Commission for Architecture and the Built Environment (CABE) (2007); Guidance on Tall Buildings.
vehicle movements and the environment and amenity of those in the vicinity of the building”.


17.2.17 The Building Research Establishment (BRE) Guidelines ‘Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice 2011, 2nd edition’ (released October 2011) provides advice on site layout planning to achieve good sun lighting and daylighting within buildings, and in the open spaces between them. It is intended for use by building designers, developers, consultants and Local Planning Authorities (LPAs). The advice it gives is not mandatory and should not be used as an instrument of planning policy, it states:

17.2.18 “This guide is a comprehensive revision of the 1991 edition of Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice. It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location.”

17.2.19 It also states:

“The advice is given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. In special circumstances the developer or planning authority may wish to use different target values… in an area with modern high rise buildings, a higher degree of obstruction maybe unavoidable if new developments are to match the height and proportions of existing building” (para.1.6).

17.2.20 In addition, the BRE Guidelines state (para. 1.3) that “it is intended to be read in conjunction with the interior daylighting recommendations in the British Standard 8206-2 Code of practice for daylighting, and in the CIBSE publication Lighting guide: daylighting and window design”.

British Standard (BS) 8206 Part 2 (2008)

17.2.21 The British Standard 8206 part 2 provides recommendations regarding the design for daylight in buildings and sets out various methods for assessing daylight. The document states:

“Daylighting gives to a building a unique variety and interest. An interior which looks gloomy, or which does not have a view to the outside when this could reasonably be expected, will be considered unsatisfactory by its users.”

17.2.22 Applications Manual Window Design of the Chartered Institute of Building Services Engineers (CIBSE) (1987)

17.2.23 This guide replaces the CIBSE Applications Manual Window Design (1987) and provides a daylight design guide. It states:

“when daylighting decisions are made, however, they will have implications for other, interrelated aspects of window performance such as solar heat gain, winter heat loss, provision of view, acoustic performance,

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61 British Standards Institution (BSI) (2008); BS8206-2: 2008 Lighting for buildings; Code of Practice for Daylighting. BSI.
62 Chartered Institution of Building Service Engineers (CIBSE) (1999); Applications Manual: Window Design of the Chartered Institute of Building Services Engineers.
privacy, security and protection from fire."


17.2.24 The CIE 146:2002 Collection on glare states:

“Disability glare is glare that impairs vision (CIE, 1987). It is caused by scattering if light inside the eye […]. The veiling luminance of scattered light will have a significant effect on visibility when intense light sources are present in the peripheral visual field and the contrast of objects to be seen is low.”

“Disability glare is most often of importance at night when contrast sensitivity is low and there may well be one or more bright light sources near to the line of sight, such as car headlights, streetlights or floodlights. But even in daylight conditions disability glare may be of practical significance: think of traffic lights when the sun is close to them, or the difficulty viewing paintings hanging next to windows.”


17.2.25 The ILP document entitled “Guidance Notes for the Reduction of Obtrusive Light” provides quantitative criteria for acceptable levels of light pollution and distinguishes between rural and dense urban areas.

Assessment Methodology

Methodology for Determining Baseline Conditions and Sensitive Receptors

17.2.26 The BRE Guidelines suggest that residential properties have the highest requirement for daylight and sunlight and states that

“the guidelines are intended for use for rooms in adjoining dwellings where light is required, including living rooms, kitchens and bedrooms”.

17.2.27 The following residential properties have been considered due to their proximity to the site and are highlighted in green on Figure 17.1.

- 3-57 Northumberland Park (odd)
- Burleigh Court
- 19 Bennets Close
- 9-13 Bennets Close
- 50 Northumberland Park
- 52 Northumberland Park
- 2-18 Worcester Avenue (even)
- 1-41 Worcester Avenue (odd)
- Northumberland Park Community School/ Sports Centre/ Resource Base
- St Paul’s and All Hallows Infant School
- 28-56 Park Lane (even)

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64 Institute of Lighting Professionals (2011) Guidance notes for the reduction of obtrusive light
17.2.28 In addition, the BRE guidelines states that schools may be considered sensitive in terms of daylight. Therefore the following schools have been included in this assessment:

- St Francais De Sales RC Primary School
- Northumberland Park Community School
- St Paul’s And All Hallows Infant School
Figure 17.1 Residential and Sensitive Properties in close proximity to the site
Scenarios Assessed

17.2.29 The following scenarios have been considered and are reported within this Chapter of the ES:

- Baseline;
- The Project; and
- Cumulative scenario

Baseline

17.2.30 The Baseline scenario consists of the existing Stadium and existing surrounding buildings as can be seen today (August 2015). This scenario is depicted on drawings 9186/18-20 (Appendix 17.1).

The Project

17.2.31 The Project scenario consists of the Project in the context of the surrounding existing environment. This scenario assesses the potential daylight, sunlight, overshadowing, solar glare and light pollution effects of the Project on the surrounding residential receptors and amenity spaces as well as sensitive road junctions.

17.2.32 This scenario is illustrated on drawing no. 9186/52-53 (Appendix 17.1).

Cumulative Scenario

17.2.33 The cumulative scenario considers the Project and the surrounding cumulative schemes and compares this against the baseline. Details of the cumulative schemes considered in the assessment are presented in Chapter 2: EIA Methodology. None of the cumulative schemes are located within close proximity to the site to result in any cumulative effects for daylight, sunlight, overshadowing, light pollution and glare. Therefore a cumulative assessment has not been considered necessary.

Methodology for Determining Demolition and Construction Effects

17.2.34 Owing to the evolving and changing nature of demolition and construction activities, the assessment of potential effects during demolition and construction of the Project on daylight and sunlight to surrounding properties has not been modelled. Instead, a qualitative assessment has been undertaken using professional judgement and experience.

17.2.35 Since the potential daylight and sunlight effects relating to demolition and construction works will vary throughout the construction programme and gradually increase to the potential effects identified for the completed Project, the interim construction effects are not assessed quantitatively as it is considered that the completed Project represents the worst case assessment in terms of likely daylight, sunlight, overshadowing, solar glare and light pollution effects.
Methodology for Determining Operational Effects

17.2.36 The following approaches are undertaken to assess the effect on the sensitive receptors of surrounding properties when the Project is completed and operational:

- Daylight;
- Vertical Sky Component (VSC);
- No Sky Line (NSL) Method;
- Sunlight; and
- Annual Probable Sunlight Hours (APSH).

17.2.37 Approaches to assessing effect on amenity areas:

- Sun Hours on Ground; and
- Transient Overshadowing.

17.2.38 The effect of solar glare is also undertaken on surrounding road users and surrounding occupants of buildings, whereas Light Pollution is typically assessed on residential receptors in close proximity to the site which are considered sensitive however, consideration may also be given to upward light spill or the general brightening of the sky at night. Environmental receptors such as bats may also be considered sensitive in terms of light pollution however; these have not been identified in regards to the site and therefore are not assessed.

Outline Approach for Daylight, Sunlight and Overshadow Assessments

17.2.39 The technical analyses carried out to inform the daylight, sunlight, and overshadowing, assessment have been undertaken by creating a digital three dimensional (3D) model of the existing Site and Project, based on measured survey data.

17.2.40 The 3D model uses Waldram Diagrams to establish the VSC and 3D geometric calculations for daylight distribution. This model (which is orientated to north by the use of Ordnance Survey (OS) information) enables the path of the sun to be tracked throughout the year to establish the shadow cast by the existing and proposed buildings and thus calculate the sun hours on ground in each scenario.

17.2.41 Only those surrounding properties which have windows facing towards the Site were included in the assessment. If a nearby property has no windows facing the Site, these properties would not be affected by the Project in terms of light.

17.2.42 Where actual room layouts were available, these have been considered in regards to the modelling of the internal layouts within the surrounding properties. Where layout information was not available assumptions have been made as to the use and internal configuration of the rooms (from external observations) behind the fenestration observed. In such cases a standard 4.2 metre (m) (14ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL).

17.2.43 Floor levels have been assumed for adjoining properties assessed, where access has not been obtained.
This dictates the level of the working plane which is relevant for the NSL assessments.

**Daylight**

*Vertical Sky Component (VSC) Method*

17.2.44 The VSC method of assessment is defined in the BRE Guidelines as the:

“ratio of that part of illuminance at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminate on a horizontal plane due to an unobstructed hemisphere of this sky”.

17.2.45 This ratio is the percentage of the total unobstructed view that is available, once obstructions (e.g. the Project), are placed in front of the point of view.

17.2.46 The assessment is calculated from the centre of a window on the outward face and measures the amount of light available on a vertical wall or window following the introduction of visible barriers, such as buildings. The VSC has been calculated by using a ‘Waldram Diagram’.

17.2.47 The Waldram Diagram is effectively a snapshot taken from that point of the sky in front of the window, together with all relevant obstructions to it, i.e. the buildings. For calculation purposes, trees may be ignored unless they form dense continuous belts. The maximum VSC value is almost 40% for a completely unobstructed vertical wall or window. In terms of assessment criteria, the BRE Guidelines state that:

“if the VSC, with the development in place, is both less than 27% and less than 0.8 times its former value, occupants of the existing building will notice the reduction in the amount of skylight. The area lit by the window may appear more gloomy and electric lighting will be needed more of the time”.

17.2.48 Where there is an extant planning permission on a site, Appendix F2 of the BRE Guide states:

“Sometimes there may be an extant planning permission for a site but the developer wants to change the design. In assessing the loss of light to existing windows nearby, a local authority may allow the vertical sky component (VSC)…for the permitted scheme to be used as alternative benchmarks. However, since the permitted scheme only exists on paper, it would be inappropriate for it to be treated in the same way as an existing building, and for the developer to set 0.8 times the values for the permitted scheme as benchmarks”.

17.2.49 In regards to the Site, planning permission has historically been granted for a development on the site. The resulting levels of daylight and sunlight as well as the impacts were considered acceptable in planning terms by the local authority for this consented scheme. Therefore if the levels of retained daylight and sunlight for the Project are in line with those of the consented scheme it may be concluded that the daylight and sunlight effects will be considered acceptable. Whilst a technical assessment has not been undertaken to compare the Project against the Consented Scheme, a comparison has been made between the results for the Project and those within the ES Chapter for the Consented Scheme, where relevant, and conclusions drawn as to whether these are similar.

**No Sky Line (NSL) Method**

17.2.50 The BRE Guidelines provide that where room layouts are known, the effect on the daylight distribution
can be calculated by plotting the NSL. In terms of the surrounding receptors, it has not been possible to obtain room layouts for all of the properties and therefore layouts have been assumed where information is not available.

17.2.51 The NSL method is a measure of the distribution of daylight at the ‘working plane’ within a room. The ‘working plane’ means a horizontal ‘desktop’ plane 0.85m in height for residential properties. The NSL divides those areas of the working plane which can receive direct sky light from those which cannot. If a significant area of the working plane lies beyond the NSL (i.e. it receives no direct sky light), then the distribution of daylight in the room will be poor and supplementary electric lighting may be required.

17.2.52 The potential effects of daylighting distribution in an existing building can be found by plotting the NSL in each of the main rooms. For houses, this will include living rooms, dining rooms and kitchens. Bedrooms should also be analysed, although they are less important. The BRE Guidelines identify that if the area of a room that does receive direct sky light is reduced to less than 0.8 times its former value, then this would be noticeable to its occupants.

17.2.53 BS 8206 Part 2 states (para 5.7) that the:

“uniformity of daylight is considered to be unsatisfactory if a significant part of the working plane (normally more than 20%) lies behind the no-sky line”.

17.2.54 Therefore, it is implied that an NSL of at least 80% would be considered satisfactory.

17.2.55 In regards to deep rooms which are lit by windows on one side, the BRE Guidelines state (para. 2.2.10):

“If an existing building contains rooms lit from one side only and greater than 5 m deep, then a greater movement of the no sky line may be unavoidable.”

**Sunlight**

*Annual Probable Sunlight Hours*

17.2.56 Sunlight is measured using a sun indicator which contains 100 spots, each representing 1% of APSH. Therefore, where no obstruction exists the total annual probable sunlight hours would amount to 1486 and therefore each spot equates to 14.86 hours of the total annual sunlight hours.

17.2.57 The number of spots is calculated for the Baseline and Project scenarios during the year and also during the winter period, and a comparison made between the two. This provides a percentage of APSH for each of the time periods for each window assessed.

17.2.58 The BRE Guidelines note that:

- “In housing, the main requirement for sunlight is in living rooms, where it is valued at any time of day, but especially in the afternoon.”
- “all main living rooms of dwellings…should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun”.
“If the main living room to a dwelling has a main window facing within 90° of due north, but a secondary window facing within 90° of due south, sunlight to the secondary window should be checked.”

“...a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day”.

17.2.59 In regards to existing surrounding receptors, the BRE Guidelines provide that a window may be adversely affected if a point at the centre of the window receives for the whole year, less than 25% of the APSH, including at least 5% of the APSH during the winter months (21st September to 21st March) and less than 0.8 times its former sunlight hours during either period, and if there is a reduction in total APSH which is greater than 4%.

17.2.60 BS 8206 Part 2 (section 5.2) states that:

17.2.61 “Provided that the entry of sunlight is properly controlled, it is generally welcome in most buildings in the UK. Dissatisfaction can arise as much from the permanent exclusion of sunlight as from its excess. The provision of sunlight is important in dwellings, particularly during winter months. Sunlight is especially valued in habitable rooms used for long periods during the day.”

17.2.62 “Interiors in which the occupants have a reasonable expectation of direct sunlight should receive at least 25% of probable sunlight hours (see 2.10.2). At least 5% of probable sunlight hours should be received during the winter months, between 21 September and 21 March. Sunlight is taken to enter an interior when it reaches one or more window reference points.”

17.2.63 As is often the case, it is not possible to determine the room uses within each of the neighbouring properties, nor is it clear which window should be considered as the ‘main windows’. Therefore, regardless of use, all the rooms with windows facing the Site and within 90 degrees of due south have been considered in the assessment.

17.2.64 Where there is an extant planning permission on a site, Appendix F2 of the BRE Guide states:

“Sometimes there may be an extant planning permission for a site but the developer wants to change the design. In assessing the loss of light to existing windows nearby, a local authority may allow the...annual probable sunlight hours (APSH) for the permitted scheme to be used as alternative benchmarks. However, since the permitted scheme only exists on paper, it would be inappropriate for it to be treated in the same way as an existing building, and for the developer to set 0.8 times the values for the permitted scheme as benchmarks”.

Summary of Criteria for Daylight and Sunlight

17.2.65 The following table provides a summary of the criteria set out within the BRE Guidelines for daylight and sunlight.
Table 17.1 Summary of Daylight and Sunlight Assessment Criteria

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<tbody>
<tr>
<td>17.2.68 VSC</td>
<td>17.2.69 A window may be adversely affected if its VSC measured at the centre of the window is less than 27% and less than 0.8 times is former value.</td>
</tr>
<tr>
<td>17.2.70 NSL</td>
<td>17.2.71 A room may be adversely affected if the daylight distribution (NSL) is reduced beyond 0.8 times its existing area.</td>
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<tr>
<td>17.2.72 APSH</td>
<td>17.2.73 A window may be adversely affected if a point at the centre of the window received for the whole year, less than 25% of the APSH including at least 5% of the APSH during the winter months (21st September to 21st March) and less than 0.8 times its former sunlight hours during either period, and for existing neighbouring buildings, if there is a reduction in total APSH which is greater than 4%.</td>
</tr>
</tbody>
</table>

**Sun Hours on Ground**

17.2.74 The method for assessing hours in sun is the ‘Sun-on-Ground indicator’. The assessment applies to both new and existing gardens / amenity areas, which are affected by new developments. The 2011 BRE Guidelines suggest that the Spring Equinox (21st March) is a suitable date for the assessment. Using specialist software, the path of the sun is tracked to determine where the sun would reach the ground and where it would not.

17.2.75 The BRE Guidelines recommend that at least half of a garden or amenity area should receive at least 2 hours of sunlight on March 21st or the area which receives 2 hours of direct sunlight should not be reduced to less than 0.8 times its former value (i.e. there should be no more than a 20% reduction). This assessment, therefore, reviews the percentage of an amenity area which receives 2 hours of direct sunlight (identified in yellow in the figures within ES Volume 3 (Appendix 17.3).

**Transient Overshadowing**

17.2.76 The 2011 BRE Guidelines suggests that where large buildings are proposed which may affect a number of gardens or open spaces, it is useful to plot a shadow plan to illustrate the location of shadows at different times of the day and year. For the purpose of this assessment the overshadowing was mapped for the following three key dates in the year:

- 21st March (Spring Equinox);
- 21st June (Summer Solstice); and
- 21st December (Winter Solstice).

17.2.77 September 21st (Autumn Equinox) provides the same overshadowing images as March 21st (Spring Equinox) as the sun follows the same path at these corresponding times of year.

17.2.78 For each of these dates, the overshadowing is calculated at hourly intervals throughout the day from 08:00 to 19:00. Some images are not included within Appendix 17.3 because the sun would not be present during these times (e.g. from approximately 16:00 onwards on 21st December) and thus no shadow can be cast.
17.2.79 The indicators are calculated for different latitudes, London being at 51.5° north. Southern orientation is critically important, as are the heights of the existing and proposed buildings.

**Light Pollution**

17.2.80 Light pollution is defined as any light emitting from artificial sources into spaces where it is unwanted, such as spillage of light from office or commercial buildings onto streets, or, into residential accommodation, such as bedrooms where this would cause nuisance to the occupants. The ILP Guidance Notes provide measurable lighting level values to ascertain the acceptability of lighting levels at night.

17.2.81 It should be noted that light pollution is not always perceived as being negative, particularly in areas of high crime where good street lighting and light into street environments is seen as a positive attribute. Adverse effects caused as a result of electric lighting include the intrusion of light into sensitive locations including adjacent residential accommodation; areas of special night-time interest; or needless spillage into the night sky.

17.2.82 It should also be noted that the ILP Guidance relates to external luminaires. Commercial buildings with large areas of glazing can sometimes cause light intrusion from their internal luminaires which may affect nearby sensitive receptors and quantitative light pollution assessments have been undertaken in relation to these internal luminaires.

17.2.83 Potential light pollution effects of a new development are typically assessed in relation to four specific criteria:

- **Sky Glow** is the brightening of the night sky over our towns, cities and countryside. It can be quantified by measuring the Upward Light Ratio (ULR), which is the maximum permitted percentage (%) of luminaire flux for the total installation that goes directly into the sky;

- **Light Intrusion** is the spilling of light beyond the boundary of a proposed development. It is assessed as vertical illuminance in lux (Ev) measured flat at the centre of the sensitive receptor;

- **Luminaire Intensity** is the uncomfortable brightness of a light source when viewed against a dark background. It is applied to each source visible from a sensitive receptor and is measured as source intensity (I) (kcd); and

- **Building Luminance** which can cause an increase in the brightness of a general area and is measured in cd per metre squared (L) as an average over the building facade caused only by external lighting.

17.2.84 The Project includes sports lighting within the Stadium and a variety of external light fittings across the Site. GIA have been supplied details of the various lighting designs and the proposed locations of these with indications of potential lux levels. Given that the majority of these fittings are located some distance from the neighbouring/proposed residential receptors and that they have been designed in accordance with the ILP and sports lighting guidance, a detailed technical assessment has not been undertaken but a qualitative assessment has been undertaken based on the methodology below.

**Light Intrusion Methodology**

17.2.85 Light pollution is not a comparative assessment; the fact it may occur in the baseline does not justify its
occurrence as a result of the Project. Therefore the assessment considers the effect of the Project in absolute terms, by reference to the relevant guidance levels.

17.2.86 The qualitative assessment considers the location of each of the light fittings in relation to the surrounding residential receptors (existing and proposed). Based on the details of the lighting design conclusions have been drawn into whether these will result in any instances of light pollution according to the four criteria above and the likelihood for these to result in light pollution and a potential nuisance using the ILP guidance. The table below from the ILP provides the recommended levels based on the environmental location of the site which in this case comes under Zone 4.
### Table 17.2 ILP Light Pollution Criteria for Environmental Zones

<table>
<thead>
<tr>
<th>Environmental Zone</th>
<th>Sky Glow ULR (Max %) (1)</th>
<th>Light Intrusion (into windows) Ev (Lux) (2)</th>
<th>Luminaire Intensity (candelas) (3)</th>
<th>Building Luminance Pre-curfew (4)</th>
<th>Average L[cd/m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>E0 – Dark areas (e.g. UNESCO Starlight Reserves, IDA Dark Sky Parks)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>E1- Intrinsically dark areas (e.g. National Parks, areas of outstanding natural beauty)</td>
<td>0</td>
<td>2</td>
<td>0 (1*)</td>
<td>2,500</td>
<td>0</td>
</tr>
<tr>
<td>E2- Low district brightness (e.g. rural or small village locations)</td>
<td>2.5</td>
<td>5</td>
<td>1</td>
<td>7,500</td>
<td>500</td>
</tr>
<tr>
<td>E3- Medium district brightness (e.g. small town centres or urban locations)</td>
<td>5.0</td>
<td>10</td>
<td>2</td>
<td>10,000</td>
<td>1,000</td>
</tr>
<tr>
<td>E4- High district brightness (e.g. town/city centres with high levels of night time activity)</td>
<td>15.0</td>
<td>25</td>
<td>5</td>
<td>25,000</td>
<td>2,500</td>
</tr>
</tbody>
</table>

**Notes:**

ULR = Upward Light Ratio of the Installation is the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky

Ev = Vertical Illuminance in Lux and is measure flat on the glazing at the centre of the window

I = Light Intensity in Cd

L = Luminance in Cd/m²

Curfew = The time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by the planning authority. If not otherwise stated – 23.00 hrs is suggested.

* = From Public road lighting installations only.

### Solar Glare

17.2.87 Solar glare is particularly important at pedestrian and road junctions, where glare can cause temporary blinding of drivers or pedestrians. Typically those elements considered reflective are either glazed apertures or metal cladding.

17.2.88 The 2011 BRE Guidelines includes the following statement in regards to the potential for reflected solar glare from a new development:

17.2.89 “Glare or solar dazzle can occur when sunlight is reflected from a glazed façade. This can affect road users outside and the occupants of adjoining buildings. The problem can occur either when there are large areas of reflective glass or cladding on the façade, or when there are areas of glass or cladding which slope back so that high altitude sunlight can be reflected along the ground. Thus solar dazzle is only a long term problem only for some heavily glazed (or mirror clad) buildings…”

### Viewpoints for Road Users and Pedestrians

17.2.90 As indicated previously, the assessment considers potentially sensitive viewpoints for road users and pedestrians surrounding the Site. The viewpoints are generally located at the minimum stopping distance...
and at the driver’s eye level. The focal point is a relevant traffic element, such as signals or incoming traffic.

17.2.91 Identifying the viewpoints based on the stopping distance is calculated as the combination of thinking and breaking distances, using the following formula:

\[ D_{\text{total}} = D_{\text{thinking}} + D_{\text{breaking}} = V \cdot T + V^2/(2 \mu \cdot g) \]

17.2.92 Where each component is:

- \( V \): Relevant vehicle speed, typically the road speed limit;
- \( T \): Thinking time (0.67 sec);
- \( \mu \): Breaking effort (considered 0.65 for cars and 0.5 for buses); and
- \( g \): Gravity acceleration.

17.2.93 The height of the viewpoint is considered to be 1.5m for cars and 2.0m for buses. Figure 17.2 below identifies the typical stopping distance range for a car travelling at different speeds. Therefore, a viewpoint for a car driving at 30mph (i.e. speed limit for a dense urban location) would be placed at 23m from a traffic light and 1.5m above the ground.

17.2.94 The assessment also considers a driver’s/pedestrian’s field of vision which takes the angular extent seen at any given time, which for humans facing forwards is approximately 180 degrees.

**Figure 17.2 Typical Stopping Distances for a car**

![Typical Stopping Distances](image)

**Solar Glare Technical Assessment**

17.2.95 The potential for reflected solar glare or dazzle from the glazed or reflective façades from a development have been assessed using specialist lighting software. The assessment shows the path of the sun for the entire year around the Project. From this, two computer generated angular images have been produced for each selected viewpoint, indicating the area which sees the reflection of the sunpath at any point during the year. A modified diagram portraying a standardised extent of human vision is then overlaid onto the image.

17.2.96 The assessment has been undertaken on the basis that the fovea centralis (also generally known as the fovea) is a part of the eye, located in the center of the macula region of the retina. The fovea is
responsible for sharp central vision (also called foveal vision), which is necessary in humans for reading, watching television, driving, and any activity where visual detail is of primary importance. The macula corresponds to the central 13 degrees of the visual field; the fovea to the central 3 degrees.

17.2.97 Figure 17.3 below highlights the degrees of vision corresponding to the foveal view, with a red circle of 3° of angle in order to identify the area most sensitive to reflected solar glare. Another red circle represents the incidence of the 30° radius of our typical field of view in order to identify a secondary area of sensitivity to potential reflected glare instances.

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17.2.98 The degrees of vision provide a reference from which potential concerns can be judged. At 3°, the potential for the reflected glare to cause a hazard is high and mitigation would be required. Between 3° and 30°, there is the potential that there could be an issue and mitigation may be necessary.

17.2.99 As stated in the CIE 146:2002, occurrences at angles beyond 30° would be of little significance in most situations, but may be relevant in exceptional circumstances. When seated in a driving seat of a typical car, for example, the limits of the windscreen would generally obstruct the driver’s view at angles beyond 30° from the line of sight. Therefore the risk of reflective solar glare causing a hazard is reduced and, as such, mitigation would make only a minor difference.

17.2.100 The methodology for solar glare is not aimed at addressing the intensity of an instance of reflected solar glare, but rather its occurrence, duration throughout the year, and the location of this occurrence in respect of an individual’s line of sight. It is also noted that the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account.

17.2.101 Although great care is taken in identifying typical viewpoints, this does not guarantee that there are no additional sensitive locations where reflected solar glare could present a particular risk. This assessment is based on the assumption that in an urban environment moving traffic represents the biggest risk factor and so viewpoints and focus points are selected accordingly. For practical reasons the area of the assessment is limited to the area surrounding the Project. The occurrence of reflected solar glare at
greater distances is not the subject of this assessment.

**Significance Criteria**

**Effect Significance Terminology Overview**

17.2.102 The assessment of effect significance outlined within the below sections is consistent with the terminology and criteria outlined within Chapter 2: EIA Methodology of this ES and accords with the relevant standards and guidance. The terminology used to describe the sensitivity of resources / receptors and magnitude of the effect will be as follows:

- High;
- Medium;
- Low; and
- Very Low.

17.2.103 The key terminology to be used to describe the classification of effects is as follows and is further described in the below sections of this chapter:

- Major;
- Moderate;
- Minor; and
- Negligible.

17.2.104 The nature of the effects may be either adverse (negative) or beneficial (positive).

17.2.105 Following the classification of an effect using this methodology, a clear statement is then made as to whether the effect is significant or not significant. As a general rule, the following criteria is applied:

- ‘Moderate’ or ‘major’ effects are deemed to be ‘significant’;
- ‘Minor’ effects are considered to be ‘not significant’, although they may be a matter of local concern; and
- ‘Negligible’ effects are considered to be ‘not significant’ and not a matter of local concern.

17.2.106 Evaluating Effects and Significance – Daylight, Sunlight, Overshadowing, Solar Glare and Light Pollution
Daylight and Sunlight

17.2.107 For daylight and sunlight, the BRE Guidelines outline the approach within the accompanying appendix, in terms of assigning criteria to assess the effects:

“Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required, or in the amount of sunlight reaching an open space… The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied.”

“Where the loss of skylight or sunlight fully meets the guidelines, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines and a larger number of windows or open space are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space.”

17.2.108 “Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or major adverse. Factors tending towards a minor adverse impact include:

- Only a small number of windows or limited area of open space are affected;
- The loss of light is only marginally outside the guidelines;
- An affected room has other sources of skylight or sunlight; and
- The affected building or open space only has a low level of requirement for skylight or sunlight.

17.2.109 The classification of major adverse is documented within Paragraph 7 of the BRE Guidelines:

“Factors tending towards a major adverse impact include:

- a large number of windows or large area of open space are affected;
- the loss of light is substantially outside the guidelines;
- all the windows in a particular property are affected; and
- the affected indoor or outdoor spaces have a particular strong requirement for skylight or sunlight, eg. a living room in a dwelling or a children’s playground.”

17.2.110 Where the BRE Guidelines are met, the effects will be considered negligible.

17.2.111 With regard to the BRE Guidelines, professional judgement has been used to determine whether the potential effects will result in adverse or beneficial effects. The initial numerical criteria for determining the category of effect is based on percentage alterations, as follows:

- 20-29.9% alteration = minor;
- 30-39.9% alteration = moderate; and
- 40% alteration = major.

17.2.112 However, when assigning criteria per property, consideration has been given to the proportion of
rooms/windows affected, as well as the percentage alterations, absolute changes, and any other relevant factors, such as there may be mitigating factors such as balconies, overhangs or design features which may also affect the determination of assigning the criteria.

**Sun Hours on Ground**

17.2.113 The table below sets out the numerical criteria adopted in regards to the sun on ground assessment based on professional judgement.

**Table 17.3 Sun on ground Significance Criteria**

<table>
<thead>
<tr>
<th>Significance</th>
<th>Numerical criteria on 21 March</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible</td>
<td>Over 50% of the amenity area will receive 2 hours of sunlight or less than 20% alteration in area which receives 2 hours of direct sunlight.</td>
</tr>
<tr>
<td>Minor adverse</td>
<td>20-29.9% reduction in the area which receives 2 hours of direct sunlight.</td>
</tr>
<tr>
<td>Moderate adverse</td>
<td>30-39.9% reduction in the area which receives 2 hours of direct sunlight.</td>
</tr>
<tr>
<td>Major adverse</td>
<td>40%+ reduction in the area which receives 2 hours of direct sunlight</td>
</tr>
</tbody>
</table>

**Transient Overshadowing**

17.2.114 The BRE Guidelines do not include criteria for the significance of transitory overshadowing other than to identify the different times of the day and year when shadow would be cast over a surrounding area.

17.2.115 The assessment of potential effects as a result of transient overshadowing is therefore based on professional judgement, taking into consideration the conditions of the existing Site and surrounding area, and comparing these conditions against the effect of the transient overshadowing arising from the Project.

**Light Pollution**

17.2.116 The ILP Guidance Notes do not provide any details with regard to the assigning of significance criteria for light pollution, therefore this is based on professional judgement considering the extent of the façade adversely affected as well as the extent to which the thresholds set out in the guidance are exceeded. As a qualitative assessment has been undertaken, the focus is on the potential likelihood for light intrusion to occur and be a nuisance to an occupant.

**Solar Glare**

17.2.117 There are no quantitative criteria within the BRE Guidelines or elsewhere regarding acceptable levels of solar glare experienced at a viewpoint. Professional judgement has therefore been applied to assign the degree of effect from the effect of solar glare arising from the Project and to determine the criteria for assessing the significance of solar glare set out in Table 17.3 below.

17.2.118 Generally, solar glare reflected at steeper angles is less likely to cause nuisance or distraction as one has to look upwards to see it.

17.2.119 As discussed at each of the locations identified, multiple viewpoints may be chosen for each of the traffic lanes or signals affected. However, in terms of significance criteria professional judgement has been used
to determine the effect at the location rather than the individual perspectives at a signal traffic
junction/pedestrian crossing.

Table 17.4 Criteria used for Determining the Effect of Solar Glare

<table>
<thead>
<tr>
<th>Significance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible</td>
<td>No reflections are visible or if visible all occur at angles greater than 30° from the driver’s line of sight and so, as stated by the CIE, will be of “little significance”</td>
</tr>
<tr>
<td>Minor</td>
<td>Solar reflections are visible within 30° to 10° or between 10° to 5° of the driver’s line of sight for a short period of time</td>
</tr>
<tr>
<td>Moderate</td>
<td>Solar reflections are visible within 10° and 5° of the driver’s line of sight occurring for a long period of time.</td>
</tr>
<tr>
<td>Major</td>
<td>Solar reflections are visible within 5° of a driver’s line of sight.</td>
</tr>
</tbody>
</table>

Note – mitigating factors such as alternative and unaffected signals/traffic lights and car visor angle may result in the assignment of significance which differs from the above numerical guidelines.

17.3 Inherent Design Mitigation

17.3.1 Throughout the design of the Project consideration has been given to the levels of daylight, sunlight and overshadowing to the surrounding receptors and amenity spaces.

17.3.2 A programme of iterative daylight and sunlight testing has assisted with the design process. A number of preliminary massing options for the north podium building and southern elements have been tested to measure the effects on neighbouring residential properties. In addition, preliminary transient overshadowing studies were undertaken to measure the effects on neighbouring residential amenity spaces, which in turn have assisted with the positioning of the southern elements.

17.3.3 A programme of iterative daylight assessments have also been undertaken with regard to the evolving design of the southern residential element. VSC façade studies showing the daylight potential to the new residential blocks are included within Appendix 17.5 and discussed in more detail within this ES Chapter.

Limitations to the Assessment

17.3.4 A qualitative assessment has been undertaken for Light Pollution based on the lighting design information supplied and professional opinion as to the probability of any light spill issues.

17.3.5 Due to the outline nature of the residential blocks these have been considered as massing only and therefore the assessments do not consider any potential reflectivity or light spill into these units, given that the window locations are not fixed.

17.4 Baseline Conditions

Daylight and Sunlight

17.4.1 Full details of the baseline assessment are located within Appendix 17.2. A total of 1589 windows serving 917 rooms within 147 properties have been assessed for daylight and 508 windows within 84 properties for sunlight. Whilst the assessment has been undertaken for all of the surrounding residential properties and schools identified in Figure 17.1 the discussion within this ES chapter focuses on the effects to those sensitive receptors identified earlier in paragraph 17.2.28 within this chapter.
17.4.2 With regard to the existing levels of daylight and sunlight for the surrounding receptors, Table 17.5 in Appendix 17.2 provides an indication of the baseline (existing) results for those properties which are considered to be sensitive in terms of daylight and sunlight. With regards to the APSH assessment, those properties that have a total of 0 windows assessed are north facing and therefore not applicable to the assessment.

17.4.3 Out of the 1589 windows assessed, 1056 (66%) have a baseline VSC equal to or greater than 27% whereas 766 (84%) out of the 917 rooms assessed have a daylight distribution to at least 80% of the total room area. With regard to sunlight out of the 594 windows assessed, 674 (88%) meet the BRE guidelines for sunlight in the baseline.

17.4.4 These relatively high levels of compliance reflect the relatively low levels of massing and obstruction currently on the site. This is not typical for an urban location such as that of the site and given the mayoral and LBH aspirations for the area it would be unreasonable to expect these levels to stay the same.

**Sun Hours on Ground**

17.4.5 Full details of the baseline sun hours on ground assessment can be found in Appendix 17.3 and summarised below.

17.4.6 In the baseline scenario all of the external amenity areas assessed will meet the BRE criteria in regards to the sun hours on ground assessment. All receive at least 2 hours of direct sunlight to at least 80% of the total area compared to the 50% required by the BRE guidelines.

17.4.7 Again these results reflect the relatively low levels of obstruction in the surrounding context and on the site.

**Transient Overshadowing**

17.4.8 The results of the existing baseline transient overshadowing assessment are shown in Appendix 17.3. Given the relatively modest height and massing of the existing buildings on Site, there is little overshadowing of the general amenity spaces and surrounding area in the baseline condition on 21st March, 21st June and 21st December.

17.4.9 Overshadowing is evident, at 17:00 GMT on the 21st March with the existing development casting shadow over the playground of St Paul's and All Hallows Infant and Junior School and the outdoor playing fields of Northumberland Park sports centre both to the east of the site. However, as this is late in the day the school playground will not be in use at this time. A small amount of shadow is also cast on the private garden of one of the residential properties on Worcester Avenue between 09:00 and 12:00 GMT. A slightly smaller amount of shadow is also cast on the school and sport centre grounds on June 21st at 20:00 GMT.

17.4.10 On 21st December, overshadowing occurs on the grounds of Northumberland Park Sports centre and Northumberland Park Community School at 15:00 GMT. A small amount of shadow is also cast on the private gardens of several of the residential properties on Worcester Avenue closest to the site between 09:00 and 11:00 GMT.
17.5 Potential Environmental Impacts and Effects

Demolition and Construction

Demolition

17.5.1 The potential significant effects of demolition of the existing buildings and structures on the Site would lead to a temporary improvement in daylight, sunlight, and overshadowing effects to residential properties and open spaces located close to the Site.

17.5.2 Portable external lighting apparatus would likely be used during the demolition phase which may result in minor instances of light pollution. However, it is likely such units would be in use during working hours only and the effects would therefore be temporary (i.e. they would only last as long as the portable lighting units are in use).

17.5.3 The likely significant daylight, sunlight and overshadowing effects during the demolition phase would be temporary and of minor beneficial significance. The effect in terms of light pollution would be of temporary and of insignificant to minor adverse significance.

Construction

17.5.4 The construction of new buildings / massing on the Site would have a gradual effect on the levels of daylight, sunlight and overshadowing on the surrounding receptors as the massing of the proposed buildings increases over time. Therefore, the effects in terms of daylight, sunlight and overshadowing would increase incrementally as the construction progresses and would be no worse than the completed Project.

17.5.5 In regards to solar glare, likely significant effects would only occur as the glazing and metal cladding is installed and therefore, would be no worse than the completed Project. Potential temporary minor adverse effects may occur in terms of light pollution with the use of portable lighting units during the construction phase. However, it is likely that these would only be used during working hours.

Operation

Daylight effects to surrounding properties

17.5.6 Full details of the daylight assessments can be found in Appendix 17.2.

17.5.7 Out of the total 1589 windows assessed 954 (60%) meet the BRE criteria for VSC whereas 696 (76%) of the 917 rooms assessed meet the criteria for NSL.

17.5.8 All of the windows within those properties highlighted green on the Table 17.6 in Appendix 17.2 would meet the BRE guidelines for VSC and NSL.

17.5.9 The results in Table 17.6 in Appendix 17.2 and the discussion below focus on those properties close to the Site and which are considered to be sensitive in terms of daylight.

St Francais De Sales RC Primary School
17.5.10 There are 54 windows within this property serving 22 rooms.

17.5.11 In regards to VSC, 37 (69%) out of the 54 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.12 All of the 17 windows that do not meet the BRE guidelines will experience alterations between 20-30% which is considered to be relatively minor adverse in significance. 13 of these windows retain a VSC of 26-26.5% which is fractionally below the BRE recommended 27% and therefore may be considered acceptable given the surrounding context of the site.

17.5.13 The remaining four windows retain an absolute VSC of 15% to 22% which could also be commensurate with a dense urban environment.

17.5.14 As this property is a school, there is a possibility that several of these windows serve circulation space or ancillary rooms rather than classrooms and other principle rooms which may not be considered sensitive in terms of daylight.

17.5.15 In regards to NSL, 14 (64%) out of the 22 rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.16 Out of the remaining eight rooms, five rooms experience alterations between 20-30%, two rooms experience alterations between 30-40% and one room experiences alterations beyond 40%. These effects are likely result of the proximity of the school to the Site combined with the undeveloped nature of the site creating open and unobstructed views. In addition, it is likely that some of the affected rooms have ancillary uses to the school such as offices or circulation space rather than classrooms and therefore may not be considered as sensitive in terms of daylight.

17.5.17 Overall given the non-residential use of this property, the effect is considered to be minor adverse in significance.

729 High Road

17.5.18 There are 26 windows within this residential property serving 12 rooms.

17.5.19 In regards to VSC, 9 (35%) out of the 26 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.20 Of the remaining 17 windows, four will experience alterations between 20-30% which is considered to be minor adverse in significance. Also, two of these windows will retain VSC levels above 24.5% which is just below the recommended 27% in the BRE guidelines.

17.5.21 Nine windows will experience alterations between 30-40%, however one of these windows serves a bedroom and is therefore considered less sensitive in daylight terms compared to other uses such as living rooms. The remainder of these windows have proposed VSC levels between 15% and 21% which may be considered commensurate with the surrounding context of an urban location.

17.5.22 A total of four will experience alterations of over 40%. However, of these four windows, one has an existing level of VSC of 4.5% which is considered low (compared to the recommended 27%) whereby any
alteration could result in a disproportionate percentage change triggering a transgression of the BRE. A second window out of the four will retain a VSC level of 17% which could be considered commensurate within the surrounding context of an urban environment.

17.5.23 In regards to NSL, nine (75%) out of the 12 rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.24 Of the three remaining rooms, two will experience an alteration between 20-30% and one will experience alterations between 30-40%. However, the latter is understood to be a bedroom which by reference to the BRE is considered less sensitive in terms of daylight compared to a living room.

17.5.25 Overall given the residential use of this property and the retained levels of daylight, the effect is considered to be minor to moderate adverse in significance.

4-18 Brereton Road

17.5.26 There are 40 windows within this property serving 40 rooms.

17.5.27 In regards to VSC, 33 (83%) out of the 40 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.28 For the remaining seven windows, three will experience alterations between 20-30% which is considered minor adverse in significance. Four windows will experience alterations between 30-40%. However, these windows have low existing levels of VSC (all under 13%) whereby any alteration may result in a disproportionate percentage change, which is further shown by the small absolute alterations that are all below 4.5%.

17.5.29 In regards to NSL, 32 (80%) out of the 40 rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.30 Of the remaining eight rooms, six will experience alterations between 20-30% and two will experience alterations between 30-40%. However, room uses are not known within this property and therefore there is a possibility that several may be bedrooms, bathrooms or circulation space which need not be considered.

17.5.31 Overall given the residential use of this property, the effect is considered to be minor adverse in significance.

Library – Kathleen Ferrier Court

17.5.32 There are 79 windows within this property serving 32 rooms.

17.5.33 In regards to VSC, 20 (25%) out of the 79 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.34 Out of the remaining 59 windows, seven windows will experience between 20-30% alterations which is considered minor adverse in significance and eight windows will experience 30-40% alterations.
17.5.35 A total of 44 windows will experience alterations above 40%. Of these, four windows will experience alterations over 78%, however the room uses are unknown for this property and there is a possibility that several of the rooms may be bathrooms or circulation space which are not relevant for the assessment. Other may be bedrooms which are less sensitive in terms of daylight than other room uses such as living rooms as stated within BRE guidelines.

17.5.36 12 of the windows experiencing in excess of 60% alterations are on the ground floor and therefore serve the library and are not considered as sensitive to residential rooms such as living rooms.

17.5.37 The existing unobscured view from this building is reflected in the high existing VSC levels shown, however, it is unreasonable to expect such levels to be maintained given the aspiration to regenerate the area.

17.5.38 In regards to NSL, 16 (50%) out of the 32 rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.39 For the remaining 16 rooms, two will experience alterations between 20-30% and nine will experience between 30-40% alterations. Therefore five rooms will experience alterations of over 40%, however as the room uses are not known for this property there is a chance that these room are less sensitive spaces such as bedrooms.

17.5.40 Overall given the retained levels of daylight the effect on Library – Kathleen Ferrier Court is considered to be moderate adverse in significance.

17.5.41 There are 28 windows within this terrace of mixed use properties serving 27 residential rooms.

17.5.42 In regards to VSC, two (7%) of the 28 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.43 The remaining 26 windows will all experience over 40% alterations in VSC level. All 26 windows will retain VSC levels above 17.5% and therefore may be considered commensurate with the surrounding context of a dense urban environment of which the Site is located within. In addition, the room uses are unknown and there is a possibility that several of the windows assessed may be bedrooms which are considered less sensitive than living areas as stated within BRE guidelines. There is also possibility that the windows serve bathrooms or circulation space which are not considered relevant within this assessment.

17.5.44 In regards to NSL, none of the 27 rooms assessed will meet the BRE guidelines experiencing in excess of 40% alterations. However, the room uses for these properties are unknown and there is a possibility that these rooms are bedrooms which by reference to the BRE are considered less sensitive in terms of daylight compared to living rooms. There is also possibility that these rooms are bathrooms or circulation space which are not considered relevant within this assessment.

17.5.45 These properties appear to have an existing unobscured view which is reflected in the existing high VSC levels. In the baseline condition the windows within these properties generally receive levels of VSC at around 35%, which represents a broadly unobstructed view of sky. Given the aspiration to regenerate the Tottenham area it is unreasonable to expect such levels to be maintained.
17.5.46 The extant planning permissions previously granted for the Project Site saw these windows typically reduced to between 20-23% retained VSC. The latest proposals do not lead to a material deviation outside of this range.

17.5.47 Overall the effect on 731-741 High Road is considered to be **moderate to major adverse** in significance.

743-759 High Road

17.5.48 There are 47 windows within this terrace of mixed use properties serving 38 residential rooms.

17.5.49 In regards to VSC, two (4%) of the 47 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.50 Of the remaining 45 windows, two windows within 759 High Road will experience between 30-40% alterations and the remaining 43 windows will all experience over 40% alterations in VSC level. All of the 45 windows that do not meet the BRE guidelines (27%) will retain VSC levels of 16% and above which may be considered commensurate with a dense urban environment. It must also be noted that room uses are unknown and there is a possibility that several of the windows assessed serve bedrooms which are considered less sensitive than living areas as stated within BRE guidelines. There is also possibility that the windows serve bathrooms or circulation space which are not considered relevant within this assessment.

17.5.51 Two of the windows that will experience over 40% alterations in VSC are both within property 745 and are understood to serve bedrooms which by reference to the BRE are considered less sensitive in terms of daylight compared to living rooms.

17.5.52 In regards to NSL, none of the 38 rooms assessed will meet the BRE guidelines with four of the remaining rooms experiencing alterations between 30-40% and 34 rooms experiencing in excess of 40% alterations. Four of the rooms will retain between 59.64-64.76% NSL levels which may be considered commensurate with the dense urban environment.

17.5.53 It is understood that one of these rooms is a bedroom within 745 High Road, therefore as stated within the BRE Guidelines is less sensitive to daylight than living rooms. However, the uses for the remaining rooms within these properties are unknown and there is a possibility that these rooms are which by reference to the BRE are considered less sensitive in terms of daylight compared to living rooms. There is also possibility that these rooms are bathrooms or circulation space which are not considered relevant within this assessment.

17.5.54 These properties appear to have an existing unobscured view which is reflected in the existing high VSC levels. In the baseline condition the windows within these properties generally receive levels of VSC at around 35%, which represents a broadly unobstructed view of sky. Given the aspiration to regenerate the Tottenham area it is unreasonable to expect such levels to be maintained.

17.5.55 The extant planning permissions previously granted for the Project site saw these windows typically reduced to between 19-23% retained VSC. The latest proposals do not lead to a material deviation outside of this range.

17.5.56 Overall the effect on 743-759 High Road is considered to be **major adverse** in significance.
Bergan-Brooklyn Apartments

17.5.57 There are 66 windows within this residential property serving 36 rooms.

17.5.58 In regards to VSC, 37 (56%) out of the 66 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.59 Of the remaining windows, five will experience alterations between 20-30% which are considered minor adverse in significance and 12 windows will experience between 30-40% alterations. Therefore 12 windows will experience over 40% alterations in VSC level, however three of these windows will still have a proposed level of 16% which can be considered commensurate with the surrounding context of a city centre location. One of these 12 windows will experience over 70% alterations however the existing VSC level is 9.5% which is considerably lower than the level recommended by the BRE guidelines (27%) whereby any alteration could result in a disproportionate percentage change.

17.5.60 Also, the room uses are unknown for this property and there is a possibility that several of these rooms bedrooms which by reference to the BRE are considered less sensitive in terms of daylight compared to living rooms. There is also possibility that these rooms are bathrooms or circulation space which are not considered relevant within this assessment.

17.5.61 In regards to NSL, 29 (81%) out of the 36 rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.62 For the remaining seven rooms, four will experience alterations between 20-30% which are considered minor adverse in significance and two rooms will experience between 30-40% alterations. This leaves one room which will experience over 40% alterations. The room will experience 46% alterations which is only slightly over the 40% mark. For the affected rooms the rooms uses are unknown therefore there is a chance they could be bedrooms which according to the BRE guidelines are considered less sensitive than living rooms. There is also possibility that these rooms are bathrooms or circulation space which are not considered relevant within this assessment.

17.5.63 Overall the effect on Bergan-Brooklyn Apartments is considered to be minor to moderate adverse in significance.

769, 771 and 771a High Road

17.5.64 There are nine windows within this terrace of mixed use properties serving nine rooms.

17.5.65 In regards to VSC, four (44%) out of the nine windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.66 The remaining five windows will all experience alterations between 20-30% which is considered of minor significance. All five rooms will also retain VSC levels of 21.5 and above which may be considered commensurate with the urban context of the site.

17.5.67 In regards to NSL, four (44%) out of the nine rooms assessed will meet the BRE guidelines and thus experience a negligible effect.
17.5.68 For the remaining five rooms, all will experience between 20-30% alterations which is considered of minor significance. However, the uses for the remaining rooms within these properties are unknown and there is a possibility that these rooms are bedrooms which by reference to the BRE are considered less sensitive in terms of daylight compared to living rooms. There is also possibility that the windows serve bathrooms or circulation space which are not considered relevant within this assessment.

17.5.69 Overall the effect on 769, 771 and 771a High Road is considered to be minor adverse in significance.

794 High Road

17.5.70 There are 19 windows within this residential property serving 11 rooms.

17.5.71 In regards to VSC, 12 (63%) out of the 19 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.72 Out of the remaining seven windows, six will experience alterations between 20-30% which is considered minor adverse in significance, leaving one window that will experience alterations between 30-40%. However, the window will still receive a proposed VSC of 17% which may be considered acceptable within the urban context of the site. It must also be noted that the room uses for this property are unknown and there is a possibility that several of the windows serve bathrooms or circulation space which are not considered relevant in this assessment. The windows could also serve bedrooms which are considered less sensitive to daylight than living rooms as stated in the BRE guidelines.

17.5.73 In regards to NSL, all of the 11 rooms (100%) assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.74 Overall the effect on 794 High Road is considered to be minor adverse in significance.

790 High Road

17.5.75 There are 12 windows within this residential property serving 12 rooms.

17.5.76 In regards to VSC, none of the windows will meet the BRE guidelines. One window will experience between 30-40% alterations and the remaining 11 windows experiencing over 40% alterations. However, 11 out of the 12 windows have proposed VSC levels above 16% and therefore may be considered commensurate within the surrounding context of an urban location. Also, the room uses for this property are unknown and there is a possibility that several of these windows serve bedrooms which are all considered less sensitive to daylight conditions than living rooms according to the BRE guidelines. There is also possibility that the windows serve bathrooms or circulation space which are not considered relevant within this assessment.

17.5.77 Similarly in regards to NSL, none of the 12 rooms assessed will meet the BRE guidelines. Five of the windows will experience 20-30% alterations which is considered of minor significance, four will experience alterations between 30-40% and the final three rooms will all experience over 40% alterations. However, the room uses for this property are unknown and there is a chance several of these rooms are bedrooms which according to the BRE guidelines are considered less sensitive than living rooms. There is also possibility that the rooms are bathrooms or circulation space which are not considered relevant within this assessment.
17.5.78 All of the rooms that will not meet the BRE guidelines will however, retain NSL levels between 50.23-74.71% which may be considered commensurate with the dense urban environment.

17.5.79 Overall the effect on 790 High Road is considered to be moderate to major adverse in significance.

45, 49 and 51 Northumberland Park

17.5.80 There are 16 windows within these terraced residential properties serving 13 rooms.

17.5.81 In regards to VSC, 12 (75%) out of the 16 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.82 The four remaining windows will all experience alterations over 40%, however the existing levels of VSC for these windows are all below 2% which is very considered low (compared to the recommended 27%) and any alteration could result in a disproportionate percentage change, which is supported by the small absolute alterations which are all below 1%. Such changes are unlikely to be noticeable to the occupant and are technical transgressions.

17.5.83 In regards to NSL, all of the 13 rooms (100%) assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.84 Given that the absolute changes are so small and unlikely to be noticeable the effect on 45, 49 and 51 Northumberland Park is considered to be negligible.

10 Worcester Avenue

17.5.85 There are five windows within this terraced residential property serving four rooms.

17.5.86 In regards to VSC, four (80%) out of the five windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.87 The one window that does not meet the BRE guidelines will experience alterations between 20-30% which is considered of minor significance. Also, the use for this room is unknown and there is a possibility that the window serves a bathroom or circulation space which are not considered relevant to this assessment or a bedroom which are considered less sensitive to daylight conditions than living areas according to the BRE guidelines.

17.5.88 In regards to NSL, all four rooms (100%) assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.89 Overall the effect on 10 Worcester Avenue is considered to be minor adverse in significance.

17.5.90 There are 226 windows within these terraced residential properties serving 53 rooms. These residential houses form a terrace on the opposite side of Worcester Avenue. They are situated to the northeast of the site.

17.5.91 In regards to VSC, 62 (27%) out of the 226 windows will meet the BRE guidelines and therefore the effect
on these windows is considered to be negligible.

17.5.92 Of the remaining 164 windows, 23 will experience between 20-30% alterations which is considered of minor significance and 19 windows will experience between (30-40%) alterations. Therefore 122 windows will experience over 40% alterations in VSC levels. However, 52 of these windows have proposed VSC levels over 15% which may be considered acceptable within the context of the urban environment.

17.5.93 166 windows serve either entrance hallways, bedrooms or garages. The 45 windows serving entrance hallways and 12 serving garages are not considered relevant in this assessment as the BRE guidance states that circulation spaces and garages need not be considered. The 109 windows serving bedrooms are considered less sensitive to daylight conditions than living rooms according to the BRE guidelines.

17.5.94 There are 60 windows serving a total of 12 living rooms which the BRE guidance states has the highest expectation for daylight. Each living room is served by 5 windows of equal size. The BRE guidelines recommend that where equal size windows serve a room the average VSC can be taken. The average retained VSC value for each living room ranges from 12-26%, which may be considered acceptable within the context of the urban environment.

17.5.95 The extant planning permissions previously granted for the Project Site saw the living rooms reduced to retain between 16-27% VSC for nos. 31 to 41 Worcester Avenue. The latest proposals therefore do not lead to a material deviation outside of this range.

17.5.96 In regards to NSL, 19 (36%) of the 53 rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.97 For the remaining rooms, two of the rooms will experience between 20-30% alterations and 1 will experience 30-40%. Therefore 31 rooms will experience over 40% alterations.

17.5.98 It must be noted that all of the rooms within 17-21 (odd) Worcester Avenue meet the BRE criteria for NSL levels. The living rooms at nos. 23 and 25 (odd) Worcester Avenue also meet the BRE criteria for NSL levels. The living room at 27 Worcester Avenue experiences a 24% reduction in NSL, which is marginally short of the BRE criteria. The overall effect to these rooms is considered minor.

17.5.99 Of the remaining 6 living rooms, located at 31 to 41 Worcester Avenue, these rooms experience reductions in NSL levels ranging from 46-64%.

17.5.100 Where there is an extant planning permission on a site, Appendix F2 of the BRE Guide states that a local authority may allow the vertical sky component (VSC) for the permitted scheme to be used as an alternative benchmark. The extant planning permissions previously granted for the Project Site saw the living rooms reduced to retain between 16-27% VSC for nos. 31 to 41 Worcester Avenue and the latest proposals do not lead to a material deviation outside of this range. Overall the effect on 17-41 Worcester Avenue is considered to be major adverse in significance.

Northumberland Park Community School

17.5.101 There are 20 windows within this school serving five rooms.

17.5.102 In regards to VSC, 17 (85%) out of the 20 windows will meet the BRE guidelines and therefore the effect
on these windows is considered to be negligible.

17.5.103 All three of the remaining windows will experience alterations between 20-30% which is considered minor adverse in significance. The three windows will also retain proposed VSC levels of 18.5% and above which may be considered acceptable given the urban environment that the site is located within.

17.5.104 In regards to NSL, three (60%) of the five rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.105 The two remaining rooms will both experience between 30-40% alterations. These effects are likely the result of the proximity of the school to the Site and the current, relatively open, view across the Site. In addition, it is a possibility that the affected rooms have ancillary uses to the school such as offices rather than classrooms and therefore may not be considered as sensitive in terms of daylight.

17.5.106 Overall the effect on Northumberland Park Community School is considered to be **minor adverse** in significance.

**St Paul’s and All Hallows School**

17.5.107 There are 37 windows within this school serving 23 rooms.

17.5.108 In regards to VSC, 16 (43%) out of the 37 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.109 Of the remaining windows, one will experience alterations between 20-30% which is considered minor adverse in significance. Eight windows will experience alterations between 30-40% although all of these affected windows will retain VSC levels between 16-24% which may be considered commensurate within the dense urban environment. 12 windows will experience over 40% alterations, however, four of these windows will retain proposed VSC levels between 16-16.5% which may be considered acceptable given the urban environment context of the site. In addition, the room uses for this property are unknown and there is a possibility that several of these windows serve ancillary rooms or circulation space rather than principle rooms such as classrooms.

17.5.110 In regards to NSL, 19 (83%) of the 23 rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.111 The four remaining rooms will all experience between 30-40% alterations. These effects are likely the result of the proximity of the school to the Site and the current, relatively open, view across the Site. In addition, it is a possibility that the affected rooms have ancillary uses to the school such as offices rather than classrooms and therefore may not be considered as sensitive in terms of daylight.

17.5.112 It must also be noted that seven of the rooms within the school will experience a gain in NSL levels.

17.5.113 Overall the effect on St Paul’s and All Hallows Infant School is considered to be **moderate adverse** in significance.

48 - 56 Park Lane
17.5.114 There are 22 windows within these mixed use terraced properties serving 22 residential rooms.

17.5.115 In regards to VSC, six (27%) out of the 22 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.116 Of the remaining windows, 13 will experience alterations between 20-30% which are considered minor adverse in significance and three windows will experience alterations between 30-40%. However, all of the rooms which do not meet the BRE guidelines will retain levels of 16% and above which may be considered commensurate with the urban context of the site.

17.5.117 In regards to NSL, 20 (95%) of the 21 rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.118 The one remaining room will experience alterations between 20-30% which is considered of minor significance. Also, the use of this room is unknown and there is a possibility that it may be used as a bedroom which are considered less sensitive to daylight conditions than living rooms. There is also possibility that this room is used as a bathroom or circulation space which are not considered relevant within this assessment.

17.5.119 Overall the effect on 48 - 56 Park Lane is considered to be minor adverse in significance.

38 - 44 Park Lane

17.5.120 There are 35 windows within these residential terraced properties serving 16 rooms.

17.5.121 In regards to VSC, none of the 35 windows will meet the BRE guidelines and all will experience alterations over 40%. However, this is due to the low existing level of VSC (all 18% or below) whereby any alteration may result in a disproportionate percentage change. Also, the room uses for this property are unknown and there is a likelihood that several of these windows serve bedrooms which according to the BRE guidelines are considered less sensitive than living rooms. There is also possibility that the windows serve bathrooms or circulation space which are not considered relevant within this assessment.

17.5.122 In regards to NSL, all of the 16 rooms (100%) assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.123 Overall the effect on 38 - 44 Park Lane is considered to be moderate adverse in significance.

28 - 36 Park Lane

17.5.124 There are 57 windows within these residential terraced properties serving 19 rooms.

17.5.125 In regards to VSC, six (11%) out of the 57 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.126 Of the remaining windows, two will experience alterations between 20-30% which are considered minor adverse in significance and 11 will experience alterations between 30-40%. Therefore 38 windows will experience alterations over 40%. However, this is due to the low existing level of VSC (all below 16%) whereby any alteration may result in a disproportionate percentage change. Also, the room uses for this
property are unknown and there is a likelihood that several of these windows serve bedrooms which according to the BRE guidelines are considered less sensitive than living rooms. The windows could also serve bathrooms or circulation space which are not considered relevant to this assessment. The close proximity of these properties to the site also plays a role in these results.

17.5.127 In regards to NSL, 17 of the 19 rooms (89%) assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.128 The remaining two rooms will both experience over 40% alterations. However, the room uses are unknown and there is a possibility that these two rooms are bedrooms which, as stated in the BRE guidelines are considered to be less sensitive to daylight conditions than living rooms. There is also possibility that the rooms are used as bathrooms or circulation space which are not considered relevant within this assessment.

17.5.129 It must also be noted that all of the rooms that will meet the BRE guidelines will experience a gain in NSL level which could be due to the relocating of the football stadium within the site.

17.5.130 Overall the effect on 28-36 Park Lane is considered to be minor to moderate adverse in significance.

1 -2 Lancaster Close

17.5.131 There are 17 windows within these residential terraced properties serving 14 rooms.

17.5.132 In regards to VSC, 13 (11%) out of the 17 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.133 Of the four remaining windows, three will experience alterations between 20-30% which is considered of minor significance and one window will experience between 30-40% alterations. However, this window will experience 30.8% alterations which is only fractionally higher than the upper limit to the 20-30% alterations range which is considered minor. Also, the uses for these rooms are not known and there is a possibility that the windows serve rooms less sensitive to daylight conditions compared to living areas, such as bedrooms. The windows could also serve bathrooms and circulation space which are not considered relevant to this assessment.

17.5.134 In addition, one of the affected windows will retain a VSC level of 21% which may be considered commensurate with the dense urban environment.

17.5.135 In regards to NSL, all of the 17 rooms (100%) assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.136 Overall the effect on 1 – 2 Lancaster Close is considered to be minor adverse in significance.

Concord House

17.5.137 There are 103 windows within this residential property serving 70 rooms. Concord House is a four storey block of duplex apartments situated to the southwest of the site across Park Lane. The facing windows serve hallways and galley style kitchens at entrance level (ground and second) and bedrooms above (first and third). The main living rooms appear to be located on the opposite side of the building, unaffected by
17.5.138 The entrances to these flats, located on ground and second floors, are served by walkways, which are set back from the façade. The fact that the windows at these levels are recessed means that they have severely restricted levels of daylight in their current condition and cannot receive skylight from an upward direction. Instead they are entirely dependent upon skylight received horizontally from across the site of the Project. This places an excessive burden upon the site of the proposal and means that the overlooking windows are unusually sensitive to changes in skylight levels.

17.5.139 The detailed results, attached within Appendix 17.2, show that in the baseline situation the majority of windows at ground and second floors receive levels of VSC between 0 – 4%, where the BRE guidance suggests a VSC of 27%. With levels as low as these, any change to the massing on the Project Site, however slight, will lead to significant changes in daylight levels. In situations such as these the BRE guidance suggests that different target criteria may be required.

17.5.140 It is therefore more appropriate to consider the impact that the proposed development has upon the bedroom windows, which are not recessed within the façade.

17.5.141 The VSC results for the whole building show that seven (7%) out of the 103 windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.142 The remaining 96 windows will all experience over 40% alterations. 41 of the windows, located on ground and second floor, have existing levels of VSC below 4% which is considerably lower than the 27% recommended by the BRE guidelines. Therefore any alteration may result in a disproportionate percentage change and trigger a transgression.

17.5.143 The remaining windows, located on first and third floors, serve bedrooms. The BRE guidance considers bedrooms less sensitive to daylight conditions than living rooms. These rooms have retained levels of VSC between 12-24%, which may be considered acceptable within the context of the site.

17.5.144 The extant planning permissions previously granted for the Project Site saw the bedroom windows on first and third floors reduced to retain between 15-22% VSC. The latest proposals therefore do not lead to a material deviation outside of this range.

17.5.145 In regards to NSL, 22 out of the 70 rooms (31%) assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.146 Of the remaining rooms, seven will experience between 20-30% alterations, three will experience 30-40% alterations and 38 will experience over 40% alterations. Six of the rooms that will experience over 40% alterations will experience over 90% alterations and one will experience 100% alterations.

17.5.147 It must also be noted that of the rooms that meet the BRE guidelines, one will experience 0% alterations and one will gain in NSL level.

17.5.148 Overall the effect on Concord House is considered to be moderate to major adverse in significance.
17.5.149 There are five windows within these mixed use properties serving four residential rooms.

17.5.150 In regards to VSC, two (40%) out of the five windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.151 Of the remaining windows, two will experience between 20-30% alterations which is considered minor adverse in significance. One window will experience alterations of 30.4% which is only fractionally above the upper limit of the 20-30% alterations which is considered minor.

17.5.152 All three of the affected windows will retain VSC levels between 24-25.5% which may be considered commensurate with the dense urban environment.

17.5.153 In addition, the uses for the rooms in this property are unknown and there is a possibility that the windows could serve bedrooms which are all considered to be less sensitive to daylight levels. The windows could also serve bathrooms or circulation space which are not considered relevant to this assessment.

17.5.154 In regards to NSL, three out of the four rooms (75%) assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.155 The remaining room will experience between 30-40 % alterations. However, since the room uses are unknown there is a chance that this room is used as a bedroom which are considered less sensitive to daylight conditions than living areas as stated within the BRE guidelines. The room will also retain a proposed NSL level of 53.05% which may be considered commensurate with the dense urban context of the site.

17.5.156 Overall, based on the retained levels of daylight, the effect on 2/2a Park Lane is considered to be minor adverse in significance.

2 Vicarage Road

17.5.157 There are two windows within this residential property serving two rooms.

17.5.158 In regards to VSC, neither of the two windows will meet the BRE guidelines and will both experience alterations between 20-30%, however, this is considered minor adverse in significance. The will still receive proposed levels on 22% and 24% which may considered commensurate with the dense urban environment.

17.5.159 In regards to NSL, one of the two rooms (50%) assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.160 The remaining room will experience 30-40% alterations, however the room will experience a retained NSL level of 62.42 which may be considered commensurate with the dense urban environment.

17.5.161 Overall the effect on 2/2a Park Lane is considered to be minor adverse in significance.

28 Bromley Road

17.5.162 There are four windows within this residential property serving two rooms.
17.5.163 In regards to VSC, two (50%) out of the four windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.164 Both of the windows that will not meet the BRE guidelines will experience 30-40% alterations, however they will retain proposed VSC levels of 18% and 19% which may be considered acceptable given the urban context of the site. The room uses are also unknown for this property and there is a possibility these windows serve rooms that are less sensitive to daylight conditions, for example, a bedroom. There is also possibility that the windows serve bathrooms or circulation space which are not considered relevant within this assessment.

17.5.165 In regards to NSL, both of the rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.166 Overall the effect on 28 Bromley Road is considered to be minor adverse in significance.

29 Bromley Road

17.5.167 There are five windows within this residential property serving two rooms.

17.5.168 In regards to VSC, two (40%) out of the five windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.169 All three remaining windows will experience 30-40% alterations, however, two will retain proposed VSC levels of 17.5% and 18% which may be considered acceptable given the urban context of the site. The third window has a low existing level of VSC whereby any change will result in a disproportionate percentage change and trigger a transgression. In addition, the room uses are unknown for this property and there is a possibility these windows serve rooms that are less sensitive to daylight conditions, for example, bathrooms or bedrooms.

17.5.170 In regards to NSL, both of the rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.171 Overall the effect on 29 Bromley Road is considered to be minor adverse in significance.

38 Bromley Road

17.5.172 There are two windows within this residential property serving two rooms.

17.5.173 In regards to VSC, neither of the two windows which have been assessed will meet the BRE guidelines.

17.5.174 These two windows will experience 20-30% alterations which is considered minor adverse in significance. Also, both will retain proposed VSC levels of 25.5% and 26% which may be considered acceptable given the urban context of the site.

17.5.175 In regards to NSL, both of the rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.176 Overall the effect on 38 Bromley Road is considered to be minor adverse in significance.
Coombes House

17.5.177 There are 50 windows within this residential property serving 32 rooms.

17.5.178 In regards to VSC, 46 (92%) out of the five windows will meet the BRE guidelines and therefore the effect on these windows is considered to be negligible.

17.5.179 All four windows that will not meet the BRE guidelines will experience 20-30% alterations which is considered minor adverse in significance. In addition, all four windows will retain proposed VSC levels above 15% which may be considered acceptable given the urban context of the site.

17.5.180 In regards to NSL, 31 of the 32 rooms assessed will meet the BRE guidelines and thus experience a negligible effect.

17.5.181 The one room that will not meet BRE guidelines will experience an alteration of 22% which is considered of minor significance compared to the level of 20% set out in the BRE guidelines. It must also be noted that five of the rooms assessed will not experience any alteration in NSL level.

17.5.182 Overall the effect on Coombes House is considered to be minor adverse in significance.

Sunlight effects to Surrounding Properties

17.5.183 Full detailed results of the sunlight assessment can be found in ES Volume 3 Appendix 17.2.

17.5.184 Out of the total 674 windows assessed 469 (70%) meet the BRE criteria for both annual and winter APSH.

17.5.185 All of the windows within those properties highlighted green in Table 17.7 in Appendix 17.2 would meet the BRE guidelines for annual and winter APSH or experience an insignificant effect.

17.5.186 The remaining properties are discussed in more detail below.

729 High Road

17.5.187 10 (91%) out of the 11 windows assessed will meet the BRE guidelines for annual and winter APSH.

17.5.188 The one window that will not meet BRE guidelines for both will experience alterations in excess of 40%. However, this window will still retain an APSH level of 24% which is only fractionally below the recommended BRE guideline of 25%.

17.5.189 The effect of the Project on 729 High Road is considered of minor adverse significance.

Library – Kathleen Ferrier Court

17.5.190 20 (80%) out of the 25 windows assessed will meet the BRE guidelines for annual and winter APSH.

17.5.191 Four windows will not meet the BRE guidelines for annual APSH, with one that will experience between 20-30% alterations and three that will experience over 40% alterations. However, all four will still retain annual APSH levels above 17% which may be considered commensurate with the urban context of the
site. All four windows will meet the BRE criteria for winter APSH.

17.5.192 One window will not meet the BRE guidelines for both annual and winter experiencing alterations in excess of 40% for both. The proposed APSH level for winter is 4% which only fractionally below the recommended 5% and could be considered commensurate for within an urban location. For the annual APSH, the existing level is 25% which is the recommended level for annual APSH stated in the BRE guidelines therefore any alterations will result in the annual APSH going below this recommended level.

17.5.193 It must also be noted that these windows are all on the ground floor which is understood to be the library and therefore commercial and not considered as sensitive to sunlight conditions as residential areas.

17.5.194 The effect of the Project on Library – Kathleen Ferrier Court is considered of minor adverse significance.

*794 High Road*

17.5.195 One window within this property was relevant for this assessment and it will not meet the BRE guidelines in either winter or annual APSH.

17.5.196 The window will experience alterations in excess of 40% for winter APSH, however the existing level of winter APSH is 2% which is already below the recommended BRE guidelines (5%) and any alteration will result in a disproportionate percentage change and trigger a transgression. The use for this room is also unknown and there is a possibility that the window could serve a bedroom, bathroom or circulation space which are not considered to be sensitive to sunlight conditions as stated within the BRE guidelines. For annual APSH the window will experience alterations between 30-40% and will not meet the BRE guidelines (25%), however the proposed APSH level will be retained at 23% which is only marginally lower than the recommended level and may be considered commensurate with the urban location of the site.

17.5.197 Since only one window is affected in isolation, the effect of the Project on 794 High Road is considered of minor adverse significance.

*10 Worcester Avenue*

17.5.198 One window was assessed for this property and it will not meet the BRE guidelines in either winter or annual APSH levels.

17.5.199 The window will experience alterations in excess of 40% for winter APSH, however the proposed level of winter APSH is 3% which could be considered commensurate with the urban context of the site. The use for this room is also unknown and there is a possibility that the window could serve a bedroom, bathroom or circulation space which are considered to be less sensitive to sunlight conditions as stated within the BRE guidelines. In addition, the annual APSH levels for this window will exceed the level recommended in the BRE Guidelines.

17.5.200 The effect of the Project on 10 Worcester Avenue is considered of minor adverse significance.

*17-41 Worcester Avenue*
17.5.201 Forty-four (20%) of the 226 windows assessed for these residential terraced properties will meet the BRE guidelines for annual and winter APSH.

17.5.202 Sixty of these windows serve entrance halls and garages and can therefore be set aside under BRE guidelines. A further 106 windows serve bedrooms, which the BRE guidelines advises are less sensitive for sunlight amenity than living rooms.

17.5.203 The remaining 60 windows serve 12 living rooms. Each living room is served by 5 windows of equal size. Where this arrangement occurs, the BRE guidelines advise that it is possible to consider the average APSH for the room.

17.5.204 The living rooms at nos. 17 and 19 Worcester Avenue will meet the BRE guidelines for annual and winter APSH. The remaining 10 rooms retain between 1-5% Winter APSH and 10-27% annual APSH, which could be considered commensurate for the urban location.

17.5.205 The extant planning permission reported reductions in annual sunlight between 20% to 50%. The latest proposals have led to a marginal increase in the upper end of this range.

17.5.206 The effect of the Project on 17-41 Worcester Avenue is considered of moderate adverse significance.

Northumberland Park Community School

17.5.207 Thirteen (87%) out of the 15 windows assessed for this school will meet the BRE guidelines for annual and winter APSH.

17.5.208 Two windows will not meet the BRE criteria for winter APSH with one window that will experience 30-40% alterations and one that will experience in excess of 40% alterations. However, both of the windows will retain proposed winter APSH levels of 4% which may be considered commensurate with the urban context of the site. It must also be noted that school rooms are not considered as sensitive to sunlight compared to living areas within residential properties.

17.5.209 The effect of the Project on Northumberland Park Community School is considered of minor adverse significance.

St Paul’s and All Hallows Infant School

17.5.210 Twenty-one (66%) out of the 32 windows assessed for this school will meet the BRE guidelines for annual and winter APSH.

17.5.211 One window will not meet the BRE criteria for winter APSH experiencing alterations in excess of 40%, however the existing APSH level was 2% therefore lower than the BRE recommended level.

17.5.212 Eleven windows will not meet the BRE criteria for annual APSH with one window experiencing 20-30% which is considered of minor significance, five windows will experience between 30-40% alterations and five windows experience in excess of 40% alterations. One of the windows has an existing APSH level of 22% which is below the BRE guidelines recommendation. Eight of these windows will still retain proposed APSH levels above 18% which may be considered commensurate with the urban environment the site is located within. In addition, three of these windows that will not meet the annual BRE criteria will
experience gains in winter APSH. It must also be noted that schools are not considered as sensitive to sunlight conditions as living areas within residential properties.

17.5.213 The effect of the Project on St Paul’s and All Hallows Infant School is considered of minor adverse significance.

Sun Hours on the Ground

17.5.214 Full details of the sun hours on ground assessment can be found in Appendix 17.3 (ES Volume 3) and are summarised below.

17.5.215 In regards to all of the external areas (area numbers 3 to 6) all of the areas will receive at least two hours of direct sunlight on March 21st to at least 50% of the total amenity space. Therefore the impact to the surrounding areas of amenity is considered to be negligible. For these areas the levels of exposure indicate that the sunlight will be considerably more than the guidelines at over 6 hours of direct sunlight on March 21st.

17.5.216 In addition, there are two areas of amenity space proposed within the Project Site, labelled areas 1 and 2 within our assessment. Both will receive at least 2 hours of direct sunlight to over 50% of the amenity space on March 21st and therefore will be fully compliant.

Transient Overshadowing

17.5.217 Full details of the transient overshadowing assessment can be found in Appendix 17.3 Annex 3 and are summarised below.

17.5.218 In regards to overshadowing, areas of amenity space are considered to be the most sensitive and the discussion below focuses on several key amenity areas identified in proximity to the Site.

March 21st

17.5.219 On March 21st, shadow would be cast to the west of the Project Site at 08:00 GMT and transient overshadowing would fall on a small portion of the school grounds and playing fields of St Francis De Sales RC Junior School. Later in the day from 16:00 GMT to 17:00 GMT, marginal additional transient overshadowing would be cast to the east of the site on the grounds of Northumberland Park Community School, Northumberland Park Sports Centre and St Paul’s and All Hallows Infant and Junior Schools. However, this overshadowing will be brief and will pass quickly.

17.5.220 In addition, additional overshadowing will occur on a couple of the private gardens to the rear of the residential properties on Worcester Avenue directly to the northeast of the site. This will occur between 9:00 GMT and 14:00 GMT on only a few gardens at a time.

17.5.221 Whilst the BRE Guidelines do not provide any criteria for transient overshadowing, using professional judgement, the potential effect of the completed Project on transient overshadowing on 21st March would be considered to be of minor significance.
June 21st

17.5.222 In the summer period shadows are shorter in length due to the higher position of the sun. On June 21st, transient overshadowing would occur on the school grounds and playing fields of St Francis De Sales RC Junior School between 06:00 BST and 08:00 BST, however this would move quickly and the majority of the playground would be out of the shadow by 09:00 BST. Later in the day at 17:00GMT transient overshadowing would occur to the west of the site on the grounds of St Paul’s and All Hallows Infant and Junior Schools. However the school playgrounds would not likely be in use at this time of day.

17.5.223 During the summer period, marginal additional transient overshadowing would be cast on Northumberland Park Sports Centre and Northumberland Park Community School between 18:00 BST and 20:00 BST.

17.5.224 Whilst the BRE Guidelines do not provide any criteria for transient overshadowing, using professional judgement, the potential effect of the completed Project on transient overshadowing on 21st June would be considered to be of minor significance.

December 21st

17.5.225 On December 21st, the sun’s altitude is particularly low, never reaching more than 15.6º. Therefore, relatively low obstructions create long shadows. The sun is only above 10º between around 9.50 and 14.10 GMT, so it is only during these periods that the BRE Guidelines suggest detailed consideration should be focused.

17.5.226 The analysis illustrates that the completed Development would cast longer shadows over the area to the north of the Site due to the lower angle of the sun. However, the only amenity space that would experience additional transient overshadowing would be the residential gardens to the north and this would occur between 11:00 GMT and 14:00 GMT. Additional overshadowing would also occur to the east of the site on the grounds of Northumberland Park Community School and Northumberland Park Sports Centre between 13:00 GMT and 14:00 GMT. However, the area of additional overshadowing on the playing pitches of Northumberland Park Sports centre would be relatively small and therefore not significant.

17.5.227 In addition, additional overshadowing will occur on a couple of the private gardens to the rear of the residential properties on Worcester Avenue directly to the northeast of the site. This will occur between 11:00GMT and 15:00 GMT.

17.5.228 In summary, using professional judgement, the changes to the existing baseline condition on December 21st as a result of the Project are considered to be minor to moderate adverse significance.

17.5.229 Overall, the effect of the Project in terms of the overshadowing of amenity areas at all times of the year is therefore considered to be minor to moderate adverse.

Light Pollution

17.5.230 A qualitative light pollution assessment has been undertaken based on the various lighting designs around the site. The assessment is broken down into each of these specific light fittings.
Street Lighting

17.5.231 Street lighting is proposed on High Road, Park Lane and Worcester Avenue.

17.5.232 The supplier has still not been chosen however, it is understood that the street lighting scheme will consist mainly of two types of 12m lighting columns: EXL15 and EXL16. The EXL15 columns will provide light to the road and footpath and the EXL16 columns will provide light to the road only.

17.5.233 There are 15 columns proposed to be installed on the ‘our’ side of the road closest to the site and 16 columns to be installed on the neighbours’ side of the road. It is assumed that the lighting will be in compliance with BS 5489 Set of standards for road lighting, particularly BS 5489-1:2013 Code of practice for the design of road lighting – Lighting of roads and public amenity areas: “… schemes close to the edge of residential areas should also receive special attention. In these cases the light distribution should be controlled to minimize light spill on adjoining areas, by selection of appropriate installed intensity class from BS EN 13201-2:2003, Table A.1.”

17.5.234 All of the proposed street lighting columns will have flat front covers that will be tilted at 16° to be BS compliant resulting in minimal glare and light spillage.

17.5.235 EXL18 fixtures are proposed to be installed to light the VIP entrance arch, however this is low brightness LED tape and therefore glare and light spillage will be minimal.
Five-a-side Football Pitch

17.5.236 It is proposed that the Five-a-side Football Pitch located within the site will be lit using four EXL 13 4m columns with eight 41.6W 4700lm LED spot lights. These will be carefully positioned to aim the light downwards as required to prevent glare. The pitch will not be lit using special sports lighting projectors and therefore should produce less light glare.

17.5.237 The proposed lighting columns are relatively short and will be tilted downwards and the Upward Light Ratio (ULR) is likely to be zero.

Stairs

17.5.238 There are several sets of stairs located in the southern part of the site. It is proposed that these stairs will be lit using EXL 08 50W 3400lm LED spot light fixtures that will be wall mounted. These will be powerful spotlights however, by aiming the lights downwards onto the stairs glare will be prevented. The light spillage is expected to be contained within the solid handrails although some outward spill will be expected but it is unlikely to affect residential occupants so as to cause a nuisance.

17.5.239 A number of sets of stairs surrounding the stadium site will are proposed to be lit using EXL02 fittings positioned on 6m columns with 16 no. 9.3W 640lm spots. The lighting columns will be located at the centre of the stairs and aimed downwards. Little to no light spillage is expected for these fixtures.

17.5.240 One handrail within the site will be lit using EXL 09 fixtures which will be LED tape integrated into the handrail that will face downwards. The spillage from these lights will be contained by the solid handrails or walls and no direct glare will be experienced.

Ramps

17.5.241 The ramps within the site will be lit using EXL 07 and EXL 10 fixture that will be wall mounted LED strips. The EXL 07 fittings will be used to illuminate pedestrian ramps and EXL 10 will provide illumination to the vehicle ramp entrance. These lights will be of low wattage and will not be directly visible therefore no glare will be produced and if any light spillage occurs it will be minimal.

17.5.242 The ramp on the north podium to the north west of the stadium will be lit using seven EXL 06 3,200lm LEDs on 5m columns. The front face of these lighting fixtures is horizontal so that the light faces downwards on to the ramp. Therefore the lights will not cause any glare to neighbours and light spillage will be minimal.

Trees

17.5.243 A number of trees surrounding the stadium within the site will be lit EXL 01 13W 487lm in ground uplighters. These fixtures will be at street level and will provide uplighting to the tree canopies. These fixtures will have an adjustable light distribution and have a walk-over and drive-over pressure load of up to 2000kg.

17.5.244 The light fixtures will have very high ULR and therefore sky glow which is expected while the trees are immature as well as in winter when leaves are shed from the trees. There is potential for these lights to cause glare to passers-by depending on the location and shielding of the lights, however, no glare from
Podium

17.5.245 It is proposed that lighting columns EXL 03 which are 10m in height and EXL 11 which are 20m in height both with 21/40 no. 9.3W 640lm spot lights will be used to provide general illumination to podium levels. These spots will be aimed downwards therefore little to no glare or light spillage is expected.

17.5.246 To provide illumination to the façade of the northern side of the stadium EXL 04 104W LED floodlights will be used. These will be mounted to the underside of the façade mesh and directed towards the podium. Since these fixtures are very powerful aiming is critical to reduce the potential for glare.

Entrance

17.5.247 The southern podium entrance is proposed to be illuminated by EXL 12 12W 1590lm Gecko projector LED fittings. These will be mounted to the façade of the southern side of the stadium. As with the illumination of the northern side of the stadium aiming is critical with regards to the potential for glare. This is possible as these fittings are adjustable by 130° tilt and rotatable by 360°.

Stadium Floodlighting

17.5.248 The stadium incorporates sports lighting including the use of internal floodlights.

17.5.249 The location and orientation of the floodlighting would likely be contained below the roofline and within the stadium and therefore is unlikely to result in light spill into surrounding residential receptors as the lighting is situated below the roofline and directed to the pitch. Some brightening of the sky portion above the stadium is typical of sports installations when the floodlighting is in use, however, the resulting brightness is likely to be in line with other stadia of a similar nature.

Solar Glare

17.5.250 Full details of the solar glare assessment are provided within ES Volume 3 Appendix 17.4.

17.5.251 The assessments have been undertaken from those signalised road junctions and pedestrian crossings nearby which are considered sensitive in terms of solar glare.

17.5.252 The following viewpoints will not experience any solar glare within 30° at any time of day throughout the year and are therefore considered to have a negligible effect with regards to solar glare:

- High Road (North) 3
- High Road (South) 2
- Park Lane (West) 1
- Park Lane (West) 2

17.5.253 The remaining viewpoints are discussed in further detail below.
Brereton Road (East)

17.5.254 A small isolated incidence of solar reflection will occur between 8:00 and 9:00GMT on the Stadium façade between 18°-30° of a driver’s line of sight. These reflections will be visible between late September and late March.

17.5.255 In addition, throughout the year, small sections of solar reflection will occur on the façade of the Stadium and The Tottenham Experience in the afternoon/early evening between 14:00 to 18:00 GMT and will occur between 7°-30° of a driver’s line of sight.

17.5.256 These reflections will only appear for a very short time and the vast majority of the solar reflections can be mitigated by the driver’s use of their sun visor. There are also no key signalling points that would be obscured by the reflections off the façades.

17.5.257 Therefore the effect of the Project at this junction is considered to be minor adverse.

Bromley Road (North)

17.5.258 There are two very small instances of solar reflection that will occur on the façade of the Stadium. One reflection will occur at around 8° of the driver’s line of sight between 9:00 and 10:00 GMT from late April to late May and late August to late September.

17.5.259 The second reflection will occur at around 25° from the driver’s line of sight between 13:00 and 14:00 GMT from late March to late April and late August to late September.

17.5.260 These instances of solar reflection will only appear for a very short time and the reflections can be mitigated by the driver’s use of their sun visor. There are also no key signalling points at this junction and the driver will be looking to their left or right rather than straight on to the Stadium. Therefore the instances of reflection will be unlikely to cause a nuisance to a driver.

17.5.261 Therefore the effect of the Project at this junction is considered to be negligible.

Church Road (East)

17.5.262 There are two small instances of solar reflection that will occur on the lower façade of the hotel between 20-30° of the driver’s line of sight between 8:00 and 10:00 GMT from late October to late February.

17.5.263 Another small instance of solar reflection will occur between 18:00 and 19:00 GMT between late April to late May and from late July to late August.

17.5.264 These instances of solar reflection will only appear for a very short time and the majority of the reflections can be mitigated by the driver’s use of their sun visor. There are traffic lights at this junction, however, they will not be obscured by the solar reflections as they will occur in the driver’s periphery and the overhang of the hotel façade above could also block the sunlight and reduce the solar reflection.

17.5.265 Therefore the effect of the Project at this junction is considered to be negligible to minor adverse.
High Road (North) 2

17.5.266 A small instance of solar reflection will occur between 14:00 and 15:00 GMT at 27° of the driver’s line of sight from late February to late March and from late September to late October.

17.5.267 This instance of solar reflections will only appear for a very short time in the periphery of the driver’s vision and the reflection can be mitigated by the driver’s use of their sun visor.

17.5.268 Therefore the effect of the Project at this junction is considered to be negligible.

High Road (South) 3

17.5.269 A small instance of solar reflection will occur between 12:00 and 13:00 GMT at 20° of the driver’s line of sight from late November to late January.

17.5.270 This instance of solar reflection will only appear for a very short time and the reflection can be mitigated by the driver’s use of their sun visor. There is a pelican crossing at this junction however it will not be obscured by the instance of solar reflection and therefore the effect is not likely to cause a nuisance to a driver.

17.5.271 Therefore the effect of the Project at this junction is considered to be negligible.

Whitehall Street (East)

17.5.272 Instances of solar reflection will occur on the Stadium façade in the evening between 16:00 and 20:00 from late February to late October within 10–30° of the driver’s line of sight.

17.5.273 There are no key signalling points at this junction and the driver will be looking to their left or right, therefore the reflections are not likely to cause a nuisance to a driver. In addition, the instances of reflection will be very short at different points across the façade at different times of the day and during different times of the year. The reflections can be mitigated by the driver’s use of a sun visor.

17.5.274 The risk associated with glare is considered in the context of the London climate and the likelihood that the sun will be shining for any reflections to occur. Within London in the evening the probability of the sun shining is reduced to 10% and therefore the likelihood that the reflections at these viewpoints will occur, is low.

17.5.275 Therefore the effect of the Project at this junction is considered to be minor to moderate adverse.

Internal Daylight Amenity

17.5.276 An assessment of the potential for daylight within the proposed residential units has been undertaken and the results can be found in Appendix 17.5 and are summarised below. The study of daylight potential is carried out with reference to BRE’s Vertical Sky Component (VSC) assessment. This is the most appropriate test to be run at Outline Stage where details such as aperture sizes and interior layouts are not the subject of the planning submission.

17.5.277 The illustrations on page 7 show the proposed massing assessed and results for the VSC test can be
It is clear from the images provided that the vast majority of the facades of the towers will achieve levels of VSC of 27% and above (depicted in yellow). BRE considers that this level of VSC will allow for interior levels of daylight which are in line with best practice.

A few portions of the facades, in particular the lower floors of the southern facade of Tower A, the eastern facade of Tower C, the northern facade of Towers B and C and the western facade of Tower A, will receive levels of VSC between 5 and 15%. This is typical of urban environments, however, a very good result considering the size and nature of this development.

According to BRE’s guide, larger windows and careful interior layout design should be adopted in order to ensure adequate levels of interior daylight.

GIA has worked alongside Allies and Morrison architects on preliminary layouts and aperture sizes in order to ensure the highest interior daylight levels possible. These will be tested and submitted as part of a detailed or reserved matters application in due course.

It is considered that the proposed illustrative massing will provide very good daylight potential overall which in turn has the potential to deliver accommodation which sees good levels of daylight indoors.

Additional Mitigation, Compensation and Enhancement Measures

Demolition and Construction

The potential effect of portable lighting would be mitigated by positioning the portable units so as not to spill light into the nearby residential properties.

The potential daylight and sunlight effects would steadily increase in magnitude as the Project is built-out. Any mitigation required in relation to the completed Development is discussed below.
Completed Development

Daylight and sunlight

17.6.3 The results of the assessments indicate some significant adverse effects in regards to daylight and sunlight when compared with the BRE guideline criteria. However, the results of the assessment need to be considered in the context of the Site’s urban location and the aspirations of both the Mayor and LBH to regenerate the surrounding Tottenham area. This is further supported by the historic consent for the site, establishing a precedent for redevelopment in this location. It would be impossible to achieve the levels of regeneration and growth on the agenda for the area without some change to the context and levels in terms of daylight and sunlight.

17.6.4 In addition, they should also be viewed in the context of the uncertainty regarding the uses of many of the rooms, which is likely to have led to an over-estimated assessment of the number of affected windows. It must also be noted that the existing levels of daylight and sunlight are relatively high for such an urban location; it would be unreasonable to expect high levels of daylight and sunlight to be maintained given the demand for development.

17.6.5 Nevertheless, given that the planning application for the Project is submitted in part outline and part detailed, and that consequently the architectural design of the Project is fixed for the purposes of the planning applications, there are no practicable opportunities for mitigating the likely significant effects identified.

Sun Hours on the Ground

17.6.6 The sun hours on the ground assessment on the surrounding areas of amenity show that all areas will experience at least 50% receiving at least two hours of direct sunlight on March 21st. Therefore the impact on the surrounding amenity space is negligible and no further mitigation is required.

Transient Overshadowing

17.6.7 The results of the assessment indicate that the Project would result in additional levels of overshadowing on the surrounding area, however these would be minor to moderate adverse in significance. Given the scale of these effects on the surrounding areas of amenity space, no mitigation measures for transient overshadowing are considered necessary.

Light Pollution

17.6.8 The results of the qualitative light pollution assessment indicate that there will likely be no significant light pollution effects and therefore no further mitigation is considered necessary.
17.6.9 Solar Glare

17.6.10 The Project will not result in significant adverse effects in regards to solar glare at nearby junctions and pedestrian crossings. The assessments undertaken assume a worst case scenario whereby the sun will shine all of the time which is not the case within the UK or London. Many of the reflections identified will occur for a short period of time, will not directly affect the view of traffic signals and may be mitigated through the use of a car sun visor.

17.6.11 Given the effect significance and the probability of these reflections occurring, no further mitigation is considered necessary.

17.7 Assessment Summary and Residual Environmental Impacts and Effects

17.7.1 A summary of residual impacts is set out in Table 17.5 below.

Demolition and Construction

17.7.2 Assuming the careful location and aiming of portable lighting, the likely residual effects of light spill during the demolition and construction phases of the Project would be negligible.

17.7.3 The potential daylight and sunlight effects would steadily increase in magnitude as the Project is built-out. There would be no practical mitigation for the gradual reduction in light as the Project proceeds towards its final massing. Therefore, the likely residual effects of the construction phase of the Project would be the same as the potential effects.

Operation

17.7.4 For the reasons outlined above, mitigation for the reduction in daylight and sunlight is impracticable. Therefore, the likely residual effects of the completed Project would remain would remain the same as the potential effects. 76 properties will experience a negligible effect whereas the remaining 71 properties will experience adverse effects ranging from minor adverse with instances of moderate to major adverse.

17.7.5 In regards to daylight, the only likely significant moderate to major and major adverse effects that are predicted to occur to 731-741 High Road, 790 High Road, 17-41 Worcester Avenue and Concord House. With regards to the properties on High Road, this is principally a result of the current open and undeveloped nature of the existing site and thus high existing levels of daylight. Given the aspirations of the Mayor and LBH to regenerate the site and the surrounding Tottenham area it would be unreasonable to expect such levels of daylight to be maintained. In regards to sunlight, the likely residual effects would remain as negligible for 60 properties whereas the remaining 24 properties will experience adverse effects ranging from minor to moderate adverse. The moderate adverse effect is predicted for the residential terraced properties 11 and 15-41 Worcester Avenue as a result of the close proximity of the properties to the site. As with daylight, the high levels of existing sunlight cannot be expected to be maintained given the aspirations to regenerate the site and surrounding area.

17.7.6 As the room uses for these properties are unknown there is a possibility that many of the windows/rooms expected to experience significant adverse impacts could serve/be bedrooms which are considered less sensitive to daylight conditions and sunlight than living rooms. There is also a possibility that a number of the windows/rooms assessed could also serve/be bathrooms, circulation space, ancillary rooms or
This is further supported by the historic consent for the site, establishing a precedent for redevelopment in this location. It would be impossible to achieve the levels of regeneration and growth on the agenda for the area without some change to the context and levels in terms of daylight. In addition, they should also be viewed in the context of the uncertainty regarding the uses of many of the rooms, which is likely to have led to an over-estimated assessment of the number of affected windows. It must also be noted that the existing levels of daylight and sunlight are relatively high for such an urban location; it would be unreasonable to expect high levels of daylight and sunlight to be maintained given the demand for development.

In addition, given that these properties are within a dense, urban environment, the current levels of daylight cannot be expected to be maintained. This low level of expectation with regard to daylight levels being maintained must be reemphasised regarding the aspirations to regenerate the area and the demand for new development in Tottenham.

In order to deliver a sports facility of this magnitude and the associated regeneration benefits to the wider area, there would invariably be a degree of adverse impact in regards to daylight and sunlight and as such a fully BRE compliant scheme would be considered a non-viable option.

In regards to overshadowing, all of the areas assessed will meet the BRE guidelines for the Sun Hours assessment and the effects will be minor to moderate adverse in significance. As with daylight, some parts of the site are currently open (e.g. the carpark) whereby there is little massing on the site. Given the aspirations for the site and surrounding area, such levels of overshadowing are not unusual and could be considered commensurate with a dense urban environment.

In regards to light pollution, no likely significant effects will occur based on the qualitative review.

In terms of the solar glare the majority of viewpoints assessed will experience a negligible to minor adverse effect. The instances of reflection identified will be brief and small in nature and are unlikely to result in any significant nuisance glare to a driver at these junctions/crossings assessed.
Table 17.5 Daylight, Sunlight and Overshadowing Residual Effects

<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Potential Effect</th>
<th>Additional Mitigation</th>
<th>Residual Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demolition and Construction Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daylight, sunlight, sun hours on ground, overshadowing, light pollution and solar glare</td>
<td>As per completed development. In terms of light pollution minor adverse effects may occur due to portable lighting units in proximity to residential receptors.</td>
<td>None required. Positioning of portable lighting units away from residential receptors.</td>
<td>As per completed development. Negligible.</td>
</tr>
<tr>
<td><strong>Operational Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daylight</td>
<td>Negligible to 76 properties with 17 instances of minor adverse, two instances of minor to moderate adverse, three instances of moderate adverse, two instances of moderate to major adverse and two instances of major adverse.</td>
<td>The scheme is fixed and therefore no further mitigation is available.</td>
<td>Negligible to minor adverse with instances of moderate and major adverse effects.</td>
</tr>
<tr>
<td>Sunlight</td>
<td>Negligible to 60 properties with six instances of minor adverse and one instances of moderate adverse effects.</td>
<td>The scheme is fixed and therefore no further mitigation is available.</td>
<td>Negligible to minor adverse with instances of moderate adverse effects.</td>
</tr>
<tr>
<td>Sun Hours on Ground</td>
<td>Negligible to surrounding amenity areas. Proposed amenity areas will meet the BRE guidelines.</td>
<td>None required.</td>
<td>Negligible.</td>
</tr>
<tr>
<td>Transient Overshadowing</td>
<td>Minor adverse for March and June 21st and minor to moderate adverse for December 21st.</td>
<td>None required given the nature of the effects.</td>
<td>Minor adverse with one instance of minor to moderate adverse.</td>
</tr>
<tr>
<td>Light Pollution</td>
<td>No significant light pollution effects likely.</td>
<td>None required.</td>
<td>No significant light pollution effects likely.</td>
</tr>
<tr>
<td>Solar Glare</td>
<td>Negligible for seven viewpoints with one instance of negligible to minor adverse, one instance of minor adverse and one instance of minor to moderate adverse.</td>
<td>None required due to the brief and isolated nature of the effects.</td>
<td>Negligible with instances of minor to moderate adverse.</td>
</tr>
<tr>
<td>Internal Daylight to proposed residential</td>
<td>The proposed illustrative massing will provide</td>
<td>N/A</td>
<td>The proposed illustrative massing will provide</td>
</tr>
<tr>
<td>towers</td>
<td>very good daylight potential overall which in turn has the potential to deliver accommodation which sees good levels of daylight.</td>
<td>very good daylight potential overall which in turn has the potential to deliver accommodation which sees good levels of daylight.</td>
<td></td>
</tr>
</tbody>
</table>
18. Electronic Interference

18.1 Introduction

18.1.1 This chapter of the Environmental Statement (ES) reports the findings of an assessment of the likely significant effects relating to electronic interference as a result of the Project in the London Borough of Haringey (LBH). The chapter summarises the relevant requirements placed upon new developments under national legislation and adopted planning policy at the national, regional and local levels.

18.1.2 It reports the findings of an assessment of the likely significant effects on digital terrestrial and satellite television reception (hereafter referred to as 'TV reception') as a result of the Project. Consideration has also been given to the potential effects on radio reception, mobile telephone signals, wireless networks and emergency service communications.

18.1.3 As well as presenting the planning policy context for the assessment, the chapter presents the methodologies used and the assumptions made in the assessment of potential effects. Areas of likely effect have been quantified and mitigation measures proposed where appropriate.

18.1.4 This assessment and ES chapter has been produced by Tom Paxton, a specialist electronic interference consultant.

18.2 Assessment Criteria and Methodology

Previous Assessment

18.2.1 The previous assessment, carried out in 2008 and updated in 2010, which supported the consented scheme, took place when analogue as well as digital terrestrial TV was being transmitted. Satellite and cable TV takeup was not as great as it is today. The assessment generated shadow areas within which terrestrial and satellite TV reception would have the potential to be adversely affected. Although these shadows remain relatively unchanged for this current assessment, the numbers of viewers potentially adversely affected will be less because of the migration from terrestrial TV reception to satellite and cable TV in the intervening years. The previous assessment identified a total of 167 aerial installations at risk of degraded TV reception. This was made up of 151 using Crystal Palace transmitter signals, 5 using Alexandra Palace transmitter signals and 11 using satellite TV signals.

Scoping Opinion

18.2.2 Although a formal Scoping Opinion was not sought the Scope of the EIA was based on the technical scope for the original 2010 ES and the Southern Addendum. A draft Scoping Report was sent to the Council on the 19th June 2015, for their informal comments and discussion. No informal comments were received in relation to this assessment.
Legislative Context

18.2.3 There is no legislation in place that is relevant to electronic interference as a result of new construction.

Planning Policy and Guidance

National Planning Policy

18.2.4 The National Planning Policy Framework (NPPF) (2012) (Ref. 18.1) states in paragraph 44 that "Local planning authorities...should ensure that: ...they have considered the possibility of the construction of new buildings or other structures interfering with broadcast and telecommunications services."

18.2.5 The National Planning Practice Guidance (NPPG) (2014) (Ref. 18-2) was launched on the 6th March 2014 and provides a web-based resource in support of the NPPF. Following its launch, a number of previously published planning guidance documents have been cancelled and are detailed within the Written Ministerial Statement titled 'Making the planning system work more efficiently and effectively', also dated 6th March 2014. There is no guidance relevant to TV reception or electronic interference.

Local Planning Policy

18.2.6 The Greater London Authority's (GLA) London Plan - The Spatial Development Strategy for London Consolidated with Alterations Since 2011(2015) (Ref. 18.3) is the statutory strategic planning framework for London. Policy 7.7 states that "tall buildings should not affect their surroundings adversely in terms of ...telecommunication interference."

18.2.7 The London Borough of Haringey's Local Plan, Strategic Policies 2013-2026 (2013) (Ref. 18.4) has no policies relevant to TV reception or electronic interference. There are no relevant policies in the saved UDP policies, Supplementary Planning Documents or the Supplementary Planning Guidance.

Guidance/ Best Practice

18.2.8 There are no international, national or regional standards or guidance available with regards to the assessment of electronic interference.

Baseline Data Collection

18.2.9 Baseline data was collected by inspecting the Ofcom database for transmitter details and conducting a site visit of the surrounding area on foot to assess TV viewing patterns.

Assessment Methodology

18.2.10 The introduction of new structures of significant height and bulk into an environment can cause disruption to the reception of electromagnetic waves. Although this effect relates to both radio and TV signals, TV reception is potentially affected more. This is because a TV receiving installation (roof-mounted aerial) is static whereas a radio can be moved about to optimise reception.

18.2.11 Radios can receive signals that have been reflected off buildings perfectly adequately. This is how they are able to operate at ground level in urban environments. There is therefore considered to be no significant risk to radio reception (both analogue and digital) and as such only TV reception will be further considered in this chapter. Similarly, the reception of mobile telephone signals, wireless networks and emergency service communications should not be compromised unless their transmitting aerials are sited
18.2.12 Terrestrial television signals are transmitted in digital format (Freeview). The only relevant interference mechanism affecting digital terrestrial TV signals is attenuation due to buildings physically blocking (and absorbing) the signals. This same mechanism affects satellite TV signals as well. If the wanted signals are too weak then the pictures very quickly deteriorate into random 'blocks' and then disappear altogether.

18.2.13 In order to define any areas where TV reception will be at risk, the details of the physical form or mass of the Project were placed in their locations on a 1:10000 scale map and, by calculation, illuminated by the TV transmitters that serve the area. The shadows subsequently cast, i.e. those areas where the signal will be blocked by the Project, were marked on a map. Calculations were carried out using International Radio Consultative Committee/International Telecommunication Union (CCIR/ITU) criteria, specifically the Appendix A3.1 parameters (Ref. 18.5). Predicted TV signal strengths for the areas were then calculated.

18.2.14 Within these theoretical areas of potential interference to TV reception a physical survey of terrestrial aerials and satellite dishes was carried out. The type and positions of the aerials gave an indication of the strength and quality of the available signal.

Construction Methodology

18.2.15 In general, effects during construction will be similar to, or less marked than, those when the buildings have been completed (see 'Operational Methodology' below). The size of the impact depends on how much of the proposed structures have been built at the time.

Operational Methodology

18.2.16 The areas where TV reception has the potential to be affected are in the radio frequency 'shadows' that the Project will cast. These are shown in Figure 18.1. The blue outlined area identifies the Project Site.

18.2.17 The shadow from the Crystal Palace transmitter will lie in lines to the north from the project site for approximately 0.90km. The shadow from the Alexandra Palace transmitter will lie in lines to the east from the project site for approximately 0.85km. The shadow from the Edmonton transmitter will lie in lines to the south from the site for approximately 1.20km. Beyond these distances the loss in TV signal is not considered to be significant. These are shown in Figure 18.1 as uncoloured black outlines.

18.2.18 Domestic satellite dishes point to the south-east. The effective satellite shadow that this Project would cast to the north-west would be for up to 100m. This is shown in Figure 18.1 as a green-coloured black outline.

18.2.19 The potential for the Project to cause interference to terrestrial and satellite TV reception has been assessed by a combination of desk-based calculations (as discussed above) and an on-site inspection of domestic aerial installations. The assessment has been carried out based on the:
- Location of the Project Site;
- Details regarding the design of the Project;
- Location of the Project with respect to key transmitters; and
- Principles of radiowave propagation.

**Assessment Criteria**

18.2.20 To determine the significance of the effects to terrestrial and satellite TV reception, professional judgement has been used to define the following criteria which have been applied throughout this assessment:

- **Adverse** - The Project is likely to cause a noticeable permanent deterioration in reception; or
- **Beneficial** - The Project is likely to result in a noticeable permanent improvement in reception; or
- **Negligible** - The Project is likely to result in no noticeable effect on reception.
- Where adverse or beneficial effects have been identified, the magnitude is described as:
  - **Negligible** - The Project is likely to affect reception for up to 20 dwellings (insignificant);
  - **Minor** - The Project is likely to affect reception for more than 20 and up to 100 dwellings (insignificant);
  - **Moderate** - The Project is likely to affect reception for more than 100 and up to 500 dwellings (significant); or
  - **Major** - The Project is likely to affect reception for more than 500 dwellings (significant).

18.2.21 Within these theoretical predicted shadow areas of potential interference to TV reception, a physical survey of domestic TV aerials has been undertaken (conducted on September 2\textsuperscript{nd}, 2014). The type and positioning of the aerials has provided an indication of the strength and quality of the available signals. The presence of cable and satellite usage was also noted, so as to ascertain whether or not particular households are depending solely on terrestrial signals.

18.2.22 The sensitivity of the receptors will vary with their use of TV services but experience shows that many high-use receptors will have high sensitivity.

**Geographical Scope**

18.2.23 The maximum length of predicted TV shadow cast by the Project has been calculated to be 1.2km. Therefore the geographical scope is **local**.

**Assumptions and Limitations**

18.2.24 Reception by portable TV sets within dwellings cannot be considered as it is not possible to make robust assumptions about the following factors: location within the dwellings; the signal attenuation due to the walls; the signal gain (if any) of the set-top aerials; and the existing quality of the reception.

18.2.25 All mitigation measures described are expected to provide TV reception of at least the same quality as that enjoyed by any affected households prior to the completion and occupation of the Project (i.e. in the baseline scenario).

**18.3 Baseline Conditions**

18.3.1 Freeview terrestrial television signals within the vicinity of the site are provided by a combination of three transmitters. The Crystal Palace transmitter is located about 20.1 km to the south of the site. The
Alexandra Palace transmitter is located about 4.5km to the west of the site and the Edmonton transmitter is about 2.4km to the north of the site. There is generally poor terrestrial signal quality in the area because of the screening effect of the existing football stadium, resulting in many using either satellite or cable signals.

18.3.2 A survey of housing in the vicinity of the site was carried out on September 2nd 2014. Most dwellings are two storey terraces or blocks of flats ranging from 5 to 20 storeys. The majority of dwellings have satellite dishes and those that have terrestrial aerials are almost exclusively using Crystal Palace signals. Cable TV is available throughout the shadow areas.

18.4 Inherent Design Mitigation

18.4.1 There is no inherent design mitigation to address electronic interference.
18.5 Potential Environmental Impacts and Effects

18.5.1 The Project is predicted to block the reception of both terrestrial and satellite TV signals at some local locations.

Construction

18.5.2 The likely impact on TV reception during the construction phase will steadily increase in magnitude as the structure of the new buildings are built and then clad. The magnitude of impacts during construction will therefore be less than the likely impacts of the completed development, as construction will increase the extent of the massing of the Project over time. Therefore, the effects of the completed development provide a worst-case scenario.

Occupation

18.5.3 Areas where TV reception has the potential to be adversely affected are in the shadows calculated to be cast by the Project, as illustrated in Figure 18.1.

18.5.4 The Crystal Palace shadow, to the north, contains 105 Crystal Palace aerial installations. Of these, 66 also have satellite dishes, leaving 39 (105-66=39) that depend solely on Crystal Palace signals and are therefore at risk of losing TV reception. It is possible that these are using cable TV signals, potentially reducing this number.

18.5.5 The Alexandra Palace shadow, to the east, contains one Alexandra Palace aerial installation that is at risk of losing TV reception. Although it does not have satellite reception as well, it may be availing itself of cable TV.

18.5.6 The Edmonton shadow, to the south, contains no Edmonton aerial installations. Therefore there are no Edmonton viewers at risk of losing TV reception as a result of the Proposed Development.

18.5.7 The satellite TV shadow, coloured green, contains 11 satellite dishes calculated to be at risk of losing TV reception.

18.5.8 This makes a total of 51 aerial installations (39+1+11=51) predicted to be adversely affected by the Project.
18.6 Additional Mitigation, Compensation and Enhancement Measures

Construction

18.6.1 As the Project increases in mass it will begin to adversely affect some of those TV aerial installations identified in this Chapter, until the maximum adverse effect is reached upon completion of the Project. TV aerial installations adversely affected can be mitigated using methods described under ‘Operation’.

Operation

18.6.2 For the 40 terrestrial aerial installations (39 Crystal Palace and 1 Alexandra Palace) at risk of adverse effects mitigation measures would include upgrading those aerials by increasing their height and gain or by providing a non-subscription satellite service such as that provided by the BBC and ITV (‘Freesat’) or by ‘Sky’ for a one-off cost.

18.6.3 For the 11 satellite dishes at risk of adverse effects mitigation measures would include increasing the height of the dishes by putting them on 2m poles or by resiting them to other parts of their properties where good reception could be achieved.

18.6.4 The developer will make contact details known for those identified as at risk of losing their TV services. Suitable mitigation will be provided in a timely manner at no cost to the affected parties.

18.7 Assessment Summary and Residual Environmental Impacts and Effects

18.7.1 A summary of residual impacts is set out in Table 18.1 at the end of this chapter.

Construction

18.7.2 Prior to mitigation the construction process is predicted to adversely affect between zero and 51 aerial installations. Following suitable mitigation there are predicted to be no residual effects.

Operation

18.7.3 Prior to mitigation the completed development is predicted to adversely affect 51 aerial installations (the same 51 as the construction phase will, as the massing increases, eventually affect).

Cumulative Effects of the Proposed Development with Other Development Schemes

18.7.4 Effects on terrestrial TV reception are generally of a cumulative and interactive nature. At reception sites, cumulative TV interference effects can be experienced which are caused by a large number of obstructions and interactions. The sources of these effects can be spread over a wide geographic area.

18.7.5 Key schemes considered are those located within the predicted shadow areas as well as those that might block the incoming terrestrial TV signals to the Project. By applying the same assessment methodology used for the Project, no schemes have been found to have the potential to create a cumulative effect.

References

Ref 18.1 Department for Communities and Local Government (DCLG), (2012); ‘The National Policy Framework’.
Ref. 18.2 DCLG, (2014); ‘The National Planning Practice Guidance’.


Ref. 18.4 London Borough of Haringey (LBH) (2013); ‘Haringey’s Local Plan, Strategic Policies 2013-2026’.

Table 18.1: Electronic Interference Residual Effects

<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance</th>
<th>Additional Mitigation</th>
<th>Residual Impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blocking terrestrial TV signals to up to 40 receptors, as the massing increases</td>
<td>High</td>
<td>Negative</td>
<td>Minor</td>
<td>Insignificant</td>
<td>Improve existing terrestrial aerials or provide a non-subscription satellite TV service</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Blocking satellite TV signals to up to 11 receptors, as the massing increases</td>
<td>High</td>
<td>Negative</td>
<td>Negligible</td>
<td>Insignificant</td>
<td>Raise dishes up and/or relocate them out of the shadow area</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Operational Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blocking terrestrial TV signals to 40 receptors (same 40 as for Construction Effects)</td>
<td>High</td>
<td>Negative</td>
<td>Minor</td>
<td>Insignificant</td>
<td>Improve existing terrestrial aerials or provide a non-subscription satellite TV service</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Blocking satellite TV signals to 11 receptors (same 11 as for Construction Effects)</td>
<td>High</td>
<td>Negative</td>
<td>Negligible</td>
<td>Insignificant</td>
<td>Raise dishes up and/or relocate them out of the shadow area</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
19. Summary of Residual Effects

19.1.1 This section summarises all residual effects which are set out in the tables below for each topic. This section also considered potential cumulative impacts resulting from combined effects.

Table 19.1: Summary of Residual Effects

<table>
<thead>
<tr>
<th>Topic</th>
<th>Environmental Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance</th>
<th>Additional Mitigation</th>
<th>Residual Impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 6: Air Quality</td>
<td>Construction Dust Impacts</td>
<td>High</td>
<td>Negative</td>
<td>n/a</td>
<td>n/a</td>
<td>A package of mitigation measures</td>
<td>n/a</td>
<td>Neutral</td>
</tr>
<tr>
<td></td>
<td>Construction Traffic Impact – No Local Construction Compound</td>
<td>High</td>
<td>Negative</td>
<td>Very Low</td>
<td>Minor</td>
<td>None</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td></td>
<td>Construction Traffic Impact – Local Construction Compound</td>
<td>High</td>
<td>Negative</td>
<td>Very Low</td>
<td>Minor</td>
<td>None</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td><strong>Chapter 7: Archaeology</strong></td>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Negative</td>
<td>Major</td>
<td>Slight/Moderate</td>
<td>None</td>
<td>Slight/moderate</td>
<td>Slight/moderate</td>
</tr>
<tr>
<td></td>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Negative</td>
<td>Major</td>
<td>Slight/Moderate</td>
<td>WB in west of Area A</td>
<td>Minor</td>
<td>Neutral/slight</td>
</tr>
<tr>
<td></td>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Negative</td>
<td>Major</td>
<td>Slight/Moderate</td>
<td>WB in west of area B</td>
<td>Minor</td>
<td>Neutral/slight</td>
</tr>
<tr>
<td></td>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Negative</td>
<td>Moderate/Major</td>
<td>Slight/Moderate</td>
<td>None</td>
<td>Slight/moderate</td>
<td>Slight/moderate</td>
</tr>
<tr>
<td></td>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Negative</td>
<td>Major</td>
<td>Slight/Moderate</td>
<td>WB in west of area D</td>
<td>Minor</td>
<td>Neutral/slight</td>
</tr>
<tr>
<td></td>
<td>Potential buried archaeological deposits</td>
<td>Low</td>
<td>Negative</td>
<td>Major</td>
<td>Slight/Moderate</td>
<td>None</td>
<td>Slight/moderate</td>
<td>Slight/moderate</td>
</tr>
</tbody>
</table>
### Chapter 8: Cultural Heritage

<table>
<thead>
<tr>
<th>Potential buried archaeological deposits</th>
<th>Medium</th>
<th>Negative</th>
<th>Negligible</th>
<th>Neutral</th>
<th>None if no instructive works take place</th>
<th>Neutral</th>
<th>Neutral</th>
</tr>
</thead>
</table>

*Please see Table 19.2 below: Cultural Heritage has been assessed against a different Significance Criteria*

### Chapter 9: Ecology

| No Construction Effect Predicated |

### Chapter 10: Surface Water Drainage and Flood Risk

<table>
<thead>
<tr>
<th>Suspended Sediment into Moselle Brook and shallow aquifer</th>
<th>Low</th>
<th>Positive</th>
<th>High</th>
<th>Moderate</th>
<th>Controlled surface water releases; Clean site; Settlement tanks;</th>
<th>Very Low</th>
<th>Minor-neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil and hydrocarbons into Moselle Brook and shallow aquifer.</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>Store hydrocarbons in bunded tank in designated area; Valves protected against vandalism; Drip trays for plant; Oil separators prior to discharge; Emergency Spillage action plan in place.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
</tr>
<tr>
<td>Concrete and cement products in to Moselle Brook and shallow aquifer.</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>Pre-mix and delivered from off-site source; Designated impermeable areas; Water for washing down will be tankered to licensed waste operator; Use of precast concrete units.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
</tr>
<tr>
<td>Contaminated Land affecting Moselle Brook and shallow aquifer.</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>Regular monitoring; If discovered, stop work, treat contaminated soil; or remove off site to licensed Waste operator.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
</tr>
<tr>
<td>Physical Disturbance to chalk aquifer</td>
<td>High</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>Monitoring to ensure confining impermeable clay layer, approx. 10m thick, to the chalk aquifer remains intact.</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td>Preferential pathways to surface water drainage system and shallow aquifer</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>Decommissioning of Boreholes to satisfaction of EA; Dewatering of excavations to approved repository; All existing utilities will be identified and marked prior to work commencing; any damage to the drainage network will be immediately repaired.</td>
<td>Very Low</td>
<td>Minor-neutral</td>
</tr>
<tr>
<td>Flood Risk to surrounding area</td>
<td>High</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
<td>The discharge rates into Moselle Brook and Thames Water Sewers will be regulated to an agreed rate ensuring no increase in flood risk.</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
</tbody>
</table>

### Chapter 11: Ground

<table>
<thead>
<tr>
<th>Direct contact with contaminants in the</th>
<th>High</th>
<th>Negative</th>
<th>Medium</th>
<th>Moderate</th>
<th>Appropriate use of personal protective equipment (PPE) and safe working procedures. Construction</th>
<th>Very Low</th>
<th>Minor</th>
</tr>
</thead>
</table>
### Conditions and Hydrogeology

| Made Ground and potential contaminated soil during site development |  |  | workers should remain vigilant of ground conditions at all times and should report any suspect areas of potential contamination. |
| Health impacts from inhalation and ingestion of contaminated dust particles Impacts to adjacent flora from exposure to phytotoxic contaminated dust particles | High | Negative | Medium | Moderate | During both demolition and construction phases of work, dust suppression measures will be employed by the contractor when necessary to prevent the potential generation of contaminated dust particles and migration off site. |
| Gas migration/accumulation | High | Negative | Medium | Moderate | Site investigation data suggests there is potential for exposure to low levels of CO2 in any confined spaces in the northern development area. There is limited potential for accumulation to hazardous concentrations due to consistently low flow rates and the nature/extent of Made Ground. Historical site investigation data (Soiltechnics) suggests there is potential for exposure to moderate levels of CO2 and CH4 in the stadium development area. Further investigation in this area will be carried out prior to development. Appropriate use of PPE and safe working procedures in any below ground/confined space work. |
| Degradation of Minor Aquifer and River Mousell via increased leaching and mobilisation of contaminants | Medium | Negative | Medium | Moderate | Excavation associated with basement carpark, infrastructure and pile caps so stockpiling of soil is likely. Where excavation of grossly contaminated soils (if encountered) is required (as part of remedial measures) stockpiling of this material will be avoided if possible. Stockpiles will be covered when not in use and placed on impermeable sheeting/hardstanding. Pollution control measures will be implemented by the contractor where required and spillage |

**Tottenham Athletic Football Club Limited**

September 2015

19.3
### Degradation of Minor Aquifer via creation of temporary preferential pathway or driving of solid contaminants into the underlying aquifer during piling.

<table>
<thead>
<tr>
<th>Severity</th>
<th>Impact</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Negative</td>
<td>Control measures will be implemented by the contractor on re-fuelling activities, storage of fuels and chemicals and vehicle movements and parking. Spill response measures will be implemented by the contractor and spillage containment will be present onsite at all times.</td>
</tr>
</tbody>
</table>

### Degradation of Minor Aquifer and River Mousell via fuel and chemical spills.

<table>
<thead>
<tr>
<th>Severity</th>
<th>Impact</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Negative</td>
<td>Control measures will be implemented by the contractor on re-fuelling activities, storage of fuels and chemicals and vehicle movements and parking. Spill response measures will be implemented by the contractor and spillage containment will be present onsite at all times.</td>
</tr>
</tbody>
</table>

### Chapter 12: Townscape and Visual

Please see Table 19.3 below: Townscape and Visual Residual Effects

### Chapter 13: Noise and Vibration

#### Construction noise (worst-case assessment)

<table>
<thead>
<tr>
<th>Location</th>
<th>Severity</th>
<th>Impact</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worcester Avenue (dwellings)</td>
<td>High</td>
<td>Negative</td>
<td>Negligible to moderate</td>
</tr>
<tr>
<td>Worcester Avenue (schools)</td>
<td>High</td>
<td>Negative</td>
<td>Moderate to major</td>
</tr>
<tr>
<td>Park Lane</td>
<td>High</td>
<td>Negative</td>
<td>Negligible to major</td>
</tr>
<tr>
<td>High Road</td>
<td>High</td>
<td>Negative</td>
<td>Negligible to major</td>
</tr>
</tbody>
</table>

#### Construction noise (average-case assessment)

<table>
<thead>
<tr>
<th>Location</th>
<th>Severity</th>
<th>Impact</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worcester Avenue (dwellings)</td>
<td>High</td>
<td>Negative</td>
<td>Negligible to moderate</td>
</tr>
<tr>
<td>Worcester Avenue (schools)</td>
<td>High</td>
<td>Negative</td>
<td>Moderate to major</td>
</tr>
</tbody>
</table>
## Operational Effects

### Means

<table>
<thead>
<tr>
<th>Means</th>
<th>Negligible to major</th>
<th>Neutral to major</th>
<th>Negligible to major</th>
<th>Negligible to major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of a CEMP Application of the principle of Best Practicable Means</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Construction vibration

<table>
<thead>
<tr>
<th>Worcester Avenue (dwellings)</th>
<th>High Road</th>
<th>Worcester Avenue (schools)</th>
<th>High Road</th>
<th>Park Lane</th>
<th>High Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction vibration</td>
<td>High</td>
<td>Negative</td>
<td>Negligible to major</td>
<td>Neutral to major</td>
<td>Implementation of a CEMP Application of the principle of Best Practicable Means</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Negative</td>
<td>Negligible to major</td>
<td>Neutral to major</td>
<td>Application of the principle of Best Practicable Means</td>
</tr>
</tbody>
</table>

### Chapter 14: Socio Economics

<table>
<thead>
<tr>
<th>Employment generation</th>
<th>Medium</th>
<th>Beneficial</th>
<th>Low</th>
<th>Minor (local)</th>
<th>None required</th>
<th>Low</th>
<th>Minor (local)</th>
<th>Neutral (regional)</th>
</tr>
</thead>
</table>

### Chapter 15: Transport

| Excavation activity, site preparation, piling and foundations - HGV | Low | Negative | Low | Minor | Routeing and scheduling of construction HGVs and delivery times | Very Low | Minor - Neutral |
| Construction of stadium - HGV Impact on highway network | Low | Negative | Medium | Minor | Routeing and scheduling of HGVs and delivery times Use of construction compound near White Hart Lane Stations | Very Low | Minor - Neutral |
| Construction of southern area uses – HGV Impact on highway network | Low | Negative | Very Low | Neutral | Routeing and scheduling of construction HGVs and delivery times | Very Low | Minor - Neutral |

### Chapter 16: Microclimate

<table>
<thead>
<tr>
<th>Wind effect on construction site</th>
<th>Medium</th>
<th>Negligible</th>
<th>Neutral</th>
<th>Neutral</th>
<th>None</th>
<th>Negligible</th>
<th>Neutral</th>
</tr>
</thead>
</table>

### Chapter 17: Daylight, Sunlight and Overshadowing

Please see Table 19.4 below: Daylight, Sunlight and Overshadowing Residual Impact Summary
### Chapter 6: Air Quality

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Nitrogen Dioxide</th>
<th>PM2.5</th>
<th>Combined Energy Plant and Operational Traffic Impact in 2021 - Nitrogen Dioxide</th>
<th>Combined Energy Plant and Operational Traffic Impact in 2021 - PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Traffic Impact in 2018 - Nitrogen Dioxide</td>
<td>High</td>
<td>Negative</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td>Operation Traffic Impact in 2018 - PM</td>
<td>High</td>
<td>Negative</td>
<td>Negligible</td>
<td>Neutral</td>
</tr>
<tr>
<td>Combined Energy Plant and Operational traffic Impact in 2021 - Nitrogen Dioxide</td>
<td>High</td>
<td>Negative</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Combined Energy Plant and Operational traffic Impact in 2021 - PM</td>
<td>High</td>
<td>Negative</td>
<td>Low</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

### Chapter 7: Archaeology

No Operational Effects Predicated

### Chapter 8: Cultural Heritage

Please see Table 19.2 below: Cultural Heritage has been assessed against a different Significance Criteria

### Chapter 9: Ecology

No Operational Effects Predicated

### Chapter 10: Surface Water Drainage and Flood Risk

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Nitrogen Dioxide</th>
<th>PM2.5</th>
<th>Combined Energy Plant and Operational Traffic Impact in 2021 - Nitrogen Dioxide</th>
<th>Combined Energy Plant and Operational Traffic Impact in 2021 - PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaks, spillage, application of fertilisers and pesticides – risk of contaminating surface water</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Contamination for insitu materials.</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Flood risk to surrounding area</td>
<td>High</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Flood risk to the Project Site</td>
<td>Low</td>
<td>Positive</td>
<td>High</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
**Chapter 11: Ground Conditions and Hydrogeology**

No Operational Effects Predicated

**Chapter 12: Townscape and Visual**

Please see Table 19.3 below: Townscape and Visual Residual Effects

<table>
<thead>
<tr>
<th>Operational road traffic noise</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Park Lane</td>
<td>High</td>
<td>Negative</td>
<td>Minor</td>
<td>Minor</td>
</tr>
<tr>
<td>Worcester Road</td>
<td>High</td>
<td>Negative</td>
<td>Minor</td>
<td>Minor</td>
</tr>
</tbody>
</table>

**Match day noise**

| Worcester Avenue (dwellings)       | High        | Negative    | Minor to major | Minor to major | None | Minor to major | Minor to major |
| Worcester Avenue (schools)         | High        | Negative    | Minor to major | Minor to major | None | Minor to major | Minor to major |
| Park Lane                          | High        | Positive    | Major         | Major         | None | Major          | Major          |
| High Road                          | High        | Negative    | Negligible to minor | Neutral to minor | None | Negligible to minor | Neutral to minor |

**Music concert noise**

| Worcester Avenue (dwellings)       | High        | Negative    | Negligible to minor | Neutral to minor | None | Negligible to minor | Neutral to minor |
| Worcester Avenue (schools)         | High        | Negative    | Negligible to minor | Neutral to minor | None | Negligible to minor | Neutral to minor |
| Park Lane                          | High        | Negative    | Negligible to minor | Neutral to minor | None | Negligible to minor | Neutral to minor |
| High Road                          | High        | Negative    | Negligible to minor | Neutral to minor | None | Negligible to minor | Neutral to minor |

**NFL noise**

| Worcester Avenue (dwellings)       | High        | Negative    | Negligible to minor | Neutral to minor | None | Negligible to minor | Neutral to minor |
| Worcester Avenue (schools)         | High        | Negative    | Negligible to minor | Neutral to minor | None | Negligible to minor | Neutral to minor |
| Park Lane                          | High        | Negative    | Negligible to minor | Neutral to minor | None | Negligible to minor | Neutral to minor |
| High Road                          | High        | Negative    | Negligible to minor | Neutral to minor | None | Negligible to minor | Neutral to minor |

**External fixed plant noise**

<p>| No specific                         | High        | Negative    | Not          | Not          | Mitigation to be considered at the detailed design | Negligible | Negligible |</p>
<table>
<thead>
<tr>
<th>Chapter 14: Socio Economics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gross Direct Employment</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Visitors &amp; Spending</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Provision of new homes</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Healthcare requirements (including delivery of Community Medical Centre)</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Open Space and Public Realm including provision of plaza and improvements to public realm</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Play space provision</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Sport and recreation</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Crime and Safety</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Chapter 15: Transport</strong></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Cumulative additional trips on rest of the highway network (non-event day) | Very Low | Negligible | Negligible | Neutral | Local traffic flows much lower. Local traffic congestion reduced by northern development highway improvements. New CPZ implemented by LBH. Major scheme to remove Tottenham Hale Gyratory. | Negligible | Neutral
---|---|---|---|---|---|---|---
Additional passengers on rail services, Underground services and bus services (non-event day) | Low | Negligible | Negligible | Neutral | Once completed service enhancements and station upgrades will improve the passenger experience. Improvements at Seven Sisters interchange. New bus station at Tottenham Hale. New Victoria Line timetable with increased frequency. New Tottenham Hale railway station, new Overground rolling stock. Upgrades to pedestrian environment along the High Road. | Medium positive | Minor positive
Pedestrians along the High Road. Additional pedestrians on non-event days | Medium | Negative | Low | Minor | Reconfiguration of footways along the High Road | Very Low | Minor
Event Day Road Closures | Low | Negative | Medium | Minor | Time that Road closures are in operation on event days will be reduced. | Negligible | Neutral
Additional queues at rail stations and Underground stations event days. Impact on background users. | Medium | Negative | Medium | Moderate | Better pedestrian routes to public transport facilities. Station Management Plans in operation. Enhanced transport services and station improvements eg Seven Sisters Interchange. Event day CPZ has been extended. New Victoria Line timetable with increased frequency. New Tottenham Hale railway station, new Overground rolling stock, new shuttle bus services. Upgrades to pedestrian environment along the High Road. | Low | Minor

**Chapter 16: Microclimate - Operational Effects – Opening Day Scenario**

| Exceedance of safety criteria | High | Negative | High | Major | landscaping, screens/signs & hoarding | Negligible | Neutral
---|---|---|---|---|---|---|---
| Wind effect on thoroughfares | High | Negative | Medium | Moderate | landscaping, screens/signs & hoarding | Low | Moderate
| Wind effect on entrances | High | Negative | Medium | Moderate | side screens | Negligible | Neutral
| Wind effect on recreational spaces | High | Negligible | Neutral | Neutral | None | Negligible | Neutral
| Wind effect on hoarding | High | Negative | Medium | Moderate | hoarding | Negligible | Neutral
### Operational Effects – Completed Podium

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Negligible</th>
<th>-</th>
<th>-</th>
<th>Negligible</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceedance of safety criteria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>As per Opening Day Scenario with the addition of further landscaping to the southern podium area</td>
<td></td>
</tr>
<tr>
<td>Wind effect on thoroughfares</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on entrances</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on recreational spaces</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on outdoor seating</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Operational Effects – Completed Hotel

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Negligible</th>
<th>-</th>
<th>-</th>
<th>Low</th>
<th>Moderate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceedance of safety criteria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on thoroughfares</td>
<td>High</td>
<td>Negative</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on entrances</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on recreational spaces</td>
<td>High</td>
<td>Negative</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on outdoor seating</td>
<td>High</td>
<td>Negative</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Operational Effects – Completed Project

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Negative</th>
<th>High</th>
<th>Major</th>
<th>Landscaping &amp; screens</th>
<th>Negligible</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exceedance of safety criteria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on thoroughfares</td>
<td>High</td>
<td>Negligible</td>
<td>Neutral</td>
<td>Neutral</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on entrances</td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td>side screens</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on recreational spaces</td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td>Landscaping &amp; balustrades</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Wind effect on outdoor seating</td>
<td>High</td>
<td>Negligible</td>
<td>-</td>
<td>-</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind effect on balconies</td>
<td>High</td>
<td>Negative</td>
<td>-</td>
<td>-</td>
<td>Landscaping &amp; parapets</td>
<td>Low</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

---

**Chapter 17: Daylight, Sunlight and Overshadowing**

*Please see Table 19.4 below: Daylight, Sunlight and Overshadowing Residual Impact Summary*
### Table 19.2: Cultural Heritage Residual Effects

<table>
<thead>
<tr>
<th>Heritage Asset</th>
<th>Description of Potential Impact/Description of View Location</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warmington House, Grade-II listed building</td>
<td>Restoration and re-use of Warmington House as part of the proposed Tottenham Experience Museum</td>
<td>Major Beneficial</td>
</tr>
<tr>
<td>Northern Terrace, Grade-II and Grade-III* listed buildings</td>
<td>Construction of the proposed development within the wider setting of the listed terrace</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>North Tottenham Conservation Area</td>
<td>Demolition and replacement of three locally listed buildings in the conservation area with new buildings forming the proposed Tottenham Experience</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td></td>
<td>Restoration and re-use of Warmington House and construction of the proposed Tottenham Experience building in the conservation area</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td></td>
<td>Construction of new stadium in, and within the setting of, the conservation area</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td></td>
<td>Construction of hotel within the setting of the conservation area</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td></td>
<td>Construction of four residential towers within the setting of the conservation area</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Construction of Extreme Sports Centre within the setting of the conservation area</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

### North Tottenham Conservation Area, Views Assessment:

<table>
<thead>
<tr>
<th>View</th>
<th>Description</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>View 15</td>
<td>West side of the High Road at the junction with Lordship Lane</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 16</td>
<td>West side of the High Road opposite the junction with Northumberland Park</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 23</td>
<td>West side of the High Road, at junction with Cedar Road</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 26</td>
<td>White Hart Lane</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 27</td>
<td>West side of the High Road, at the junction with White Hart Lane</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 31</td>
<td>South side of Church Road, looking northeast</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 32</td>
<td>West side of the High Road, at the junction with Ruskin Road</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 33</td>
<td>West side of the High Road opposite, and just north of junction with Bromley Road</td>
<td>Moderate Beneficial</td>
</tr>
<tr>
<td>View</td>
<td>Location Description</td>
<td>Impact of Proposed Development on Wider Setting</td>
</tr>
<tr>
<td>------</td>
<td>----------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>34</td>
<td>West side of the High Road, just north of junction with Hampden lane</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>View 1</td>
<td>Alexandra Palace and Park Conservation Area</td>
<td>Impact of proposed development on wider setting of conservation area.</td>
</tr>
<tr>
<td>View 10</td>
<td>Tottenham Cemetery Conservation Area</td>
<td>Impact of proposed development on wider setting of conservation area.</td>
</tr>
<tr>
<td>Bruce Castle Conservation Area: View 11</td>
<td>Impact of proposed development on wider setting of conservation area (view locations described below):</td>
<td></td>
</tr>
<tr>
<td>View 11</td>
<td>Bruce Castle Conservation Area, north-western edge of Bruce Castle Park</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td>View 12</td>
<td>Bruce Castle Conservation Area, southern end of Bruce Castle Park</td>
<td>Negligible</td>
</tr>
<tr>
<td>View 35</td>
<td>Bruce Castle Conservation Area, Bruce Grove adjoining Edmansons Close</td>
<td>Negligible</td>
</tr>
<tr>
<td>View 13</td>
<td>Tottenham Green Conservation Area: View 13</td>
<td>Impact of proposed development on wider setting of conservation area</td>
</tr>
<tr>
<td>View 36</td>
<td>Scotland Green Conservation Area: View 36</td>
<td>Impact of proposed development on wider setting of conservation area</td>
</tr>
<tr>
<td>View 37</td>
<td>Bruce Grove Conservation Area: View 37</td>
<td>Impact of proposed development on wider setting of conservation area</td>
</tr>
</tbody>
</table>
Table 19.3: Townscape and Visual Residual Effects

<table>
<thead>
<tr>
<th>Location</th>
<th>Sensitivity</th>
<th>Overall Sensitivity</th>
<th>Size / Scale of Change</th>
<th>Geographical Influence</th>
<th>Duration and Reversibility</th>
<th>Overall Magnitude</th>
<th>Significance of Effect (Construction)</th>
<th>Magnitude (Year 1 - Winter)</th>
<th>Significance of Effect (Year 1 - Winter)</th>
<th>Magnitude (Year 15 - Summer)</th>
<th>Significance of Effect (Year 15 - Summer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects on Townscape Site Features</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landform</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>Negligible</td>
<td>Medium</td>
<td>High</td>
<td>Low Adverse</td>
<td>Negligible</td>
<td>Medium</td>
<td>High</td>
<td>Low Adverse</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Low Adverse</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Low Adverse</td>
</tr>
<tr>
<td>Built Form</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Very High, High</td>
<td>High</td>
<td>High</td>
<td>Very High Adverse</td>
<td>Very High</td>
<td>Very High</td>
<td>High</td>
<td>Major Beneficial</td>
</tr>
<tr>
<td>Free Standing Built Structures</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low Adverse</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low Adverse</td>
</tr>
<tr>
<td>Land Use</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Low Adverse</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Moderate Benefit</td>
</tr>
<tr>
<td>Public Access</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Moderate Adverse</td>
<td>Medium</td>
<td>Medium</td>
<td>Moderate Adverse</td>
<td>Moderate Benefit</td>
</tr>
<tr>
<td>1: THFC Stadium</td>
<td>Low</td>
<td>Low</td>
<td>Very Low</td>
<td>Very High</td>
<td>Very High</td>
<td>Low</td>
<td>Very High Adverse</td>
<td>Very High</td>
<td>Very High</td>
<td>Very High</td>
<td>Very High Adverse</td>
</tr>
<tr>
<td>2: Tottenham High Road</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>High Adverse</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Major Beneficial</td>
</tr>
<tr>
<td>3: North Tottenham Low Level Industrial Estates</td>
<td>Low</td>
<td>Low</td>
<td>Very Low</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Minor Adverse</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Minor Beneficial</td>
</tr>
<tr>
<td>4: East Tottenham Large Scale Residential</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Moderate Adverse</td>
<td>High Adverse</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Moderate Benefit</td>
</tr>
</tbody>
</table>

Tottenham Athletic Football Club Limited

September 2015
## Effects on Views

<table>
<thead>
<tr>
<th>Site Description</th>
<th>Adverse</th>
<th>Moderate</th>
<th>Beneficial</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alexandra Palace</strong></td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td><strong>Parliament Hill</strong></td>
<td>Low</td>
<td>No change</td>
<td>High</td>
</tr>
<tr>
<td><strong>Royal Observatory, Greenwich Park</strong></td>
<td>Low</td>
<td>No change</td>
<td>High</td>
</tr>
<tr>
<td><strong>Intersection of Lordship Lane and High Road, Wood Green</strong></td>
<td>Low</td>
<td>No change</td>
<td>High</td>
</tr>
<tr>
<td><strong>Western edge of Lordship Recreation Ground</strong></td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

### 5: East Tottenham Linear Residential
- **Adverse:** Medium
- **Moderate:** Low
- **Beneficial:** High

### 6: East Tottenham Mixed Linear Residential
- **Adverse:** Low
- **Moderate:** No change
- **Beneficial:** High

### 7: Northumberland Park Discordant Residential
- **Adverse:** Minor
- **Moderate:** Neutral
- **Beneficial:** Negligible

### 8: Bruce Castle Mixed Open Space
- **Adverse:** Negligible
- **Moderate:** Beneficial
- **Beneficial:** Very Low

### 9: Lee Valley Large Scale Industrial
- **Adverse:** Negligible
- **Moderate:** Beneficial
- **Beneficial:** Very Low

### 10: West Tottenham Large Scale Mixed Development
- **Adverse:** Negligible
- **Moderate:** Beneficial
- **Beneficial:** Very Low
### EIA Environmental Statement

**Volume 2: Main Report**

<table>
<thead>
<tr>
<th>6. Forest Lane Bridge Crossing of River Lea</th>
<th>Low</th>
<th>Medium</th>
<th>Low</th>
<th>Low</th>
<th>Low</th>
<th>Low</th>
<th>Medium</th>
<th>Low</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
<th>Low</th>
<th>Minor</th>
<th>Low</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
<th>Minor</th>
<th>Moderate</th>
<th>Neutral</th>
<th>High</th>
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<th>No Change</th>
<th>No Change</th>
<th>No Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Public Footpath, Tottenham Marshes</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Adverse</td>
<td>Medium</td>
<td>Medium</td>
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<td>Low</td>
<td>Moderate</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
<td>Minor</td>
<td>Neutral</td>
<td>High</td>
<td>High</td>
<td>No Change</td>
<td>No Change</td>
<td>No Change</td>
</tr>
<tr>
<td>8. Eastern End of Park Lane</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Adverse</td>
<td>High</td>
<td>High</td>
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<td>Low</td>
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<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>9. Northern End of Fore Street, Upper Edmonton</td>
<td>Low</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
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<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>10. War Memorial, Tottenham Cemetery</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Very Low</td>
<td>Low</td>
<td>Very Low</td>
<td>Adverse</td>
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<td>Very Low</td>
<td>Adverse</td>
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<td>Adverse</td>
<td>Very Low</td>
<td>Adverse</td>
<td>Very Low</td>
<td>High</td>
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<td>High</td>
<td>Very Low</td>
<td>Adverse</td>
<td>Very Low</td>
<td>High</td>
</tr>
<tr>
<td>11. Bruce Castle Park, close to the boundary with Church Lane</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>to High</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Adverse</td>
<td>Medium</td>
<td>to High</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
<td>Neutral</td>
<td>Low</td>
<td>Medium</td>
<td>to High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>12. North-east of Bruce Castle within Bruce Castle Park</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Very Low</td>
<td>Low</td>
<td>Low</td>
<td>Very Low</td>
<td>Adverse</td>
<td>Very Low</td>
<td>Low</td>
<td>High</td>
<td>Very Low</td>
<td>Adverse</td>
<td>Very Low</td>
<td>Adverse</td>
<td>Very Low</td>
<td>Adverse</td>
<td>Very Low</td>
<td>High</td>
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<td>High</td>
<td>Very Low</td>
<td>Adverse</td>
<td>Very Low</td>
<td>High</td>
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<tr>
<td>13. High Cross at the Junction of High Road with Monument Way</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Adverse</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Beneficial</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
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<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>14. Harlington Park</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>Low to Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Adverse</td>
<td>Low to Medium</td>
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<td>Low</td>
<td>Neutral</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
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<td>Neutral</td>
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<td>Neutral</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
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<tr>
<td>15. Crossroads of High Road and Lansdowne Road</td>
<td>Medium</td>
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<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Adverse</td>
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### 16. Junction with High Road and Northumberland Park

<table>
<thead>
<tr>
<th></th>
<th>Medium</th>
<th>Medium</th>
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<th>Medium</th>
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<th>Moderate Neutral</th>
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<th>Medium</th>
<th>High</th>
<th>High</th>
<th>Neutral</th>
<th>Major Neutral</th>
<th>Moderate Neutral</th>
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### 17. Northumberland Park at the junction with Worcester Avenue

<table>
<thead>
<tr>
<th></th>
<th>Medium</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Adverse</th>
<th>Moderate Adverse</th>
<th>High</th>
<th>Medium</th>
<th>High</th>
<th>High</th>
<th>Neutral</th>
<th>Major Neutral</th>
<th>High</th>
<th>Medium</th>
<th>High</th>
<th>High</th>
<th>Neutral</th>
<th>Major Neutral</th>
<th>Moderate Neutral</th>
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</table>

### 18. Trulock Road, Tottenham

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
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<th>High</th>
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<th>High</th>
<th>Adverse</th>
<th>Moderate Adverse</th>
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<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Moderate</th>
<th>High</th>
<th>Moderate</th>
<th>Beneficial</th>
<th>Moderate</th>
<th>Beneficial</th>
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### 19. Almond Road near to Lea Valley School

<table>
<thead>
<tr>
<th></th>
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<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>High</th>
<th>Adverse</th>
<th>Moderate Adverse</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Neutral</th>
<th>Major Neutral</th>
<th>Moderate Neutral</th>
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### 20. Park Lane at the junction with St Paul’s Road

<table>
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<tr>
<th></th>
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<th>High</th>
<th>Adverse</th>
<th>Moderate Adverse</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
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<th>Moderate</th>
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<th>High</th>
<th>High</th>
<th>High</th>
<th>Neutral</th>
<th>Major Neutral</th>
<th>Moderate Neutral</th>
</tr>
</thead>
</table>

### 21. Corner of Vicarage Road and Park Lane, Tottenham

<table>
<thead>
<tr>
<th></th>
<th>Medium</th>
<th>High</th>
<th>High</th>
<th>Very High</th>
<th>Very High</th>
<th>Low</th>
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<th>Adverse</th>
<th>Substantial Adverse</th>
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<th>Very High</th>
<th>High</th>
<th>Very High</th>
<th>Beneficial</th>
<th>Moderate Neutral</th>
<th>Very High</th>
<th>Very High</th>
<th>High</th>
<th>Very High</th>
<th>Beneficial</th>
<th>Moderate Neutral</th>
<th>Substantial Beneficial</th>
</tr>
</thead>
</table>

### 22. Bromley Road

<table>
<thead>
<tr>
<th></th>
<th>Medium</th>
<th>High</th>
<th>High</th>
<th>Very High</th>
<th>Very High</th>
<th>Low</th>
<th>Very High</th>
<th>Adverse</th>
<th>Substantial Adverse</th>
<th>Very High</th>
<th>Very High</th>
<th>High</th>
<th>Very High</th>
<th>Neutral</th>
<th>Moderate Neutral</th>
<th>Very High</th>
<th>Very High</th>
<th>High</th>
<th>Very High</th>
<th>Neutral</th>
<th>Moderate Neutral</th>
<th>Substantial Neutral</th>
</tr>
</thead>
</table>

### 23. Tottenham High Road at the Junction with Cedar Road

<table>
<thead>
<tr>
<th></th>
<th>Medium</th>
<th>Medium</th>
<th>Medium</th>
<th>High</th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Adverse</th>
<th>Moderate Adverse</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Neutral</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Neutral</th>
<th>Major Neutral</th>
<th>Moderate Neutral</th>
</tr>
</thead>
</table>

### 24. Bereton Road

<table>
<thead>
<tr>
<th></th>
<th>Medium</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Adverse</th>
<th>Major Adverse</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Neutral</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>High</th>
<th>Neutral</th>
<th>Major Neutral</th>
<th>Moderate Neutral</th>
</tr>
</thead>
</table>

Tottenham Athletic Football Club Limited
Table 19.4: Daylight, Sunlight and Overshadowing Residual Effects

<table>
<thead>
<tr>
<th>Environmental Effect</th>
<th>Potential Effect</th>
<th>Additional Mitigation</th>
<th>Residual Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demolition and Construction Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daylight, sunlight, sun hours on ground, overshadowing, light pollution and solar glare</td>
<td>As per completed development. In terms of light pollution minor adverse effects may occur due to portable lighting units in proximity to residential receptors.</td>
<td>None required. Positioning of portable lighting units away from residential receptors.</td>
<td>As per completed development. Negligible</td>
</tr>
<tr>
<td>Operational Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daylight</td>
<td>Negligible to 76 properties with 17 instances of minor adverse, two instances of minor to moderate adverse, three instances of moderate adverse, two instances of moderate to major adverse and two</td>
<td>The scheme is fixed and therefore no further mitigation is available.</td>
<td>Negligible to minor adverse with instances of moderate and major adverse effects.</td>
</tr>
<tr>
<td>Environmental Impact</td>
<td>Description</td>
<td>Impact</td>
<td>Response</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------</td>
<td>--------</td>
<td>----------</td>
</tr>
<tr>
<td>Sunlight</td>
<td>Negligible to 60 properties with six instances of minor adverse and one instances of moderate adverse effects.</td>
<td>The scheme is fixed and therefore no further mitigation is available.</td>
<td>Negligible to minor adverse with instances of moderate adverse effects.</td>
</tr>
<tr>
<td>Sun Hours on Ground</td>
<td>Negligible to surrounding amenity areas. Proposed amenity areas will meet the BRE guidelines.</td>
<td>None required</td>
<td>Negligible</td>
</tr>
<tr>
<td>Transient Overshadowing</td>
<td>Minor adverse for March and June 21st and minor to moderate adverse for December 21st.</td>
<td>None required given the nature of the effects.</td>
<td>Minor adverse with one instance of minor to moderate adverse.</td>
</tr>
<tr>
<td>Light Pollution</td>
<td>No significant light pollution effects likely.</td>
<td>None required</td>
<td>No significant light pollution effects likely.</td>
</tr>
<tr>
<td>Solar Glare</td>
<td>Negligible for seven viewpoints with one instance of negligible to minor adverse, one instance of minor adverse and one instance of minor to moderate adverse.</td>
<td>None required due to the brief and isolated nature of the effects.</td>
<td>Negligible with instances of minor to moderate adverse.</td>
</tr>
<tr>
<td>Internal Daylight to proposed residential towers</td>
<td>The proposed illustrative massing will provide very good daylight potential overall which in turn has the potential to deliver accommodation which sees good levels of daylight.</td>
<td>N/A</td>
<td>The proposed illustrative massing will provide very good daylight potential overall which in turn has the potential to deliver accommodation which sees good levels of daylight.</td>
</tr>
</tbody>
</table>
Combined Residual Effects

19.1.2 Table 19.5 below sets out the combined residual effects from multiple disciplines. These potential combined effects have not been quantitatively measured and are based on professional judgement.

Table 19.5: Combined Residual Effects

<table>
<thead>
<tr>
<th>Topics</th>
<th>Environmental Effect</th>
<th>Sensitivity of Receptor</th>
<th>Nature of Impact</th>
<th>Impact Magnitude</th>
<th>Significance</th>
<th>Additional Mitigation</th>
<th>Residual Impact Magnitude</th>
<th>Residual Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cumulative Construction Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A number of appropriate mitigation measures have been set out to mitigate any potential significant adverse impacts on the Moselle Brook. The mitigation set out for both of these topics does not conflict, and the potential impacts do not give rise to any significant adverse effects.</td>
<td>Very Low</td>
<td>Minor</td>
</tr>
<tr>
<td>Chapter 10: Surface Water Drainage and Flood Risk</td>
<td></td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 11: Ground Conditions and Hydrogeology</td>
<td>There are a number of potential cumulative environmental effects during construction that could affect the Moselle Brook.</td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Details of measures to protect the environment during the construction of the Project will be set out in a Construction Environmental Management Plan (CEMP). Such measures will address hours of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 10: Surface Water Drainage and Flood Risk</td>
<td></td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td></td>
<td>Low</td>
<td>Minor</td>
</tr>
<tr>
<td>Chapter 11: Ground Conditions and Hydrogeology</td>
<td>There are a number of potential cumulative environmental effects during construction that could affect the aquifer.</td>
<td>High</td>
<td>Negative</td>
<td>Medium</td>
<td>Moderate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapter 6: Air Quality</td>
<td>Construction traffic along High Road may result in potential cumulative</td>
<td>High</td>
<td>Negligible to High</td>
<td>Neutral to Major</td>
<td></td>
<td></td>
<td>Negligible to High</td>
<td>Neutral to Major</td>
</tr>
<tr>
<td>Chapter 13: Noise and</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
### Vibration
**Chapter 12: Townscape and Visual**
Environmental effects during construction that could affect air quality, noise/vibration and traffic.

Additionally, the existing townscape of High Road will be temporarily effected during construction.

### Air Quality
**Chapter 6:**
Construction traffic along Park Lane may result in potential cumulative environmental effects during construction that could affect air quality, noise/vibration and traffic.

Additionally, the existing townscape of High Road will be temporarily affected during construction.

### Noise and Vibration
**Chapter 13:**
Details of measures to protect the environment during the construction of the Project will be set out in a Construction Environmental Management Plan (CEMP). Such measures will address hours of working, noise, vibration, dust, light spill, wheel washing and control of run-off. It is anticipated that the implementation of the CEMP will be a condition on the planning permission and it will be regularly monitored.

Therefore, no additional mitigation is proposed.

### Transport
**Chapter 15:**
Vibration, noise, vibration, dust, light spill, wheel washing and control of run-off. It is anticipated that the implementation of the CEMP will be a condition on the planning permission and it will be regularly monitored.

Therefore, no additional mitigation is proposed.

### Cumulative Operational Effects
**Chapter 8:**
The existing townscape of

<table>
<thead>
<tr>
<th>Cumulative Operational Effects</th>
<th>Medium</th>
<th>Negligible to High</th>
<th>Neutral to Moderate</th>
<th>No additional mitigation.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chapter 8: Cultural</strong></td>
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<tr>
<td>Heritage</td>
<td>Chapter 12: Townscape and Visual</td>
<td>Bruce Castle Park may be temporarily effected during construction.</td>
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<tr>
<td>Chapter 6: Air Quality</td>
<td>Chapter 13: Noise and Vibration</td>
<td>Chapter 15: Transport</td>
<td>Cumulative additional trips on the highway network. Local roads around Project Site, e.g. Park Lane. The surrounding road network may be impacted by combined effects from traffic, noise and air quality.</td>
<td>Medium to High</td>
</tr>
</tbody>
</table>